United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232

Environmental Assessment
ES-020-2017-02

EOI #2254, 2255 Catahoula Parish, Louisiana
EOI #2261 Bienville Parish, Louisiana
Lease EA

April 10, 2017

Figures

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LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

APD	Application for Permit to Drill
APLIC	Avian Power Line Interaction Committee
AQI	Air Quality Index
BCC	Birds of Conservation Concern
BLH	Bottomland Hardwood
BLM	Bureau of Land Management
BMP	Best Management Practices
°C	Celsius
CAIR	Clean Air Interstate Rule
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COA	Condition of Approval
CSU	Controlled Surface Use
°F	degrees Fahrenheit
DBH	Diameter-at-Breast-Height
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOI	Expression of Interest
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FOOGLA	Federal Onshore Oil and Gas Leasing Reform Act
GHG	Greenhouse Gas
GIS	Geographic Information System
GWP	Global Warming Potential
HAP	Hazardous Air Pollutants
H_2S	Hydrogen Sulfide
HFC	Hydrofluorocarbon
HV	High-Volume
IM	Internal Memo
IPCC	Intergovernmental Panel on Climate Change
IQ	Intelligence Quotient
KNF	Kisatchie National Forest
LDEQ	Louisiana Department of Environmental Quality
LDNROC	Louisiana Department of Natural Resources, Office of Conservation
LDWF	Louisiana Department of Wildlife and Fisheries
LESO	Louisiana Ecological Services Office
LNHP	Louisiana Natural Heritage Program
LPS	Louisiana Pine Snake
LSU	Louisiana State University
MBTA	Migratory Bird Treaty Act
MLA	Mineral Leasing Act
MOU	Memorandum of Understanding
N	North
NAAQS	National Ambient Air Quality Standards

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	Nitrogen oxides (generic for air pollutants - NO and NO_2)
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NWR	National Wildlife Refuge
O_3	Ozone
Pb	Lead
PFC	Perfluorocarbon
$PM_{2.5}$	Particulate Matter
PM_{10}	Particulate Matter
PPM	Parts per Million
PSD	Prevention of Significant Determination
RCRA	Resource Conservation Recovery Act
RCW	Red-Cockaded Woodpecker
RFD	Reasonably Foreseeable Development
SF	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMZ	Streamside Management Zone
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SPCCP	Spill Prevention Control and Countermeasure Plan
STAR	EPA's Science to Achieve Results program
Std	Standard
Tg	Metric Ton
TCP	Traditional Cultural Property
US	United States
USACE	United States Army Corp of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WMA	Wildlife Management Area
WO	Washington Office
WQCC	Water Quality Control Commission

EXECUTIVE SUMMARY

Proposed Action. The Proposed Action is to lease 50.15 acres of federal minerals located in Catahoula and Bienville Parishes, Louisiana for potential future oil and gas development. The lease parcels evaluated as part of the Proposed Action consists of federal mineral estate underlying private surface and are assigned Expression of Interest (EOI) #2254, 2255, and 2261. The proposed leases would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities at this stage. Although there would be no surface disturbance from the action of leasing, this Environmental Assessment (EA) analyzes a reasonably foreseeable development (RFD) scenario to address the anticipated environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this time. Before a lease owner or operator conducts any surface disturbing activities related to the development of this lease to access the federal minerals, the Bureau of Land Management (BLM) must first approve an application for permit to drill (APD) as specified in Title 43 Code of Federal Regulations (CFR) 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM would also conduct additional site-specific analysis in compliance with the National Environmental Policy Act (NEPA) and the appropriate consultations prior to approving the APD. The RFD scenario projects 14.97 acres of total surface disturbance from potential future oil and gas development associated with the three proposed leases (2.76 acres for EOI #2254, 3.22 acres for EOI #2255, and 8.99 acres for EOI #2261).

Purpose and Need. The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy while minimizing adverse effects to natural and cultural resources. The BLM minimizes adverse effects to resources by identifying appropriate lease stipulations and notices, best management practices, and mitigations. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended (30 United States Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which reduces the dependence of the United States on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

The leasing of federal minerals is vital to the United States oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to EOI #2254, 2255, and 2261, consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

Environmental Impacts. The anticipated environmental impacts of the Proposed Action and No Action Alternative are summarized in Table ES-1.

Table ES-1: Summary of anticipated environmental effects.

Resource	No Action Alternative	Proposed Action
Land Use	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Minor, short and long term changes to land use from reasonably foreseeable development activities due to conversion of undeveloped areas to areas that support potential future oil and gas development.
Noise/Visual Resources	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Minor, short and long term adverse noise and visual impacts possible from reasonably foreseeable development associated with the lease parcel. Noise levels would lessen during the production phase.
Socioeconomics and Environmental Justice	Loss, reduction, or delay of revenues generated through leasing and royalties.	Leasing would generate revenues that would be shared with counties. Reasonably foreseeable development may generate additional royalties, economic stimulation in the form of additional employment, output, and support services. Environmental justice concerns are not expected.
Cultural Resources and Native American Interests	Would result in the continuation of the current land and resource uses. Potential impacts from "relic hunting", bulldozing, etc.	No direct impacts from leasing. Future surveys or consultation under the National Historic Preservation Act (NHPA) may be required at the APD stage.
Mineral Resources	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Use and depletion of the resource would occur from reasonably foreseeable development.
Wastes	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Wastes would be generated from reasonably foreseeable development, with a potential for short and long term adverse impacts if wastes are not properly handled, stored, and disposed. Standard operating procedures (SOPs), best management practices (BMPs), and conditions of approval (COAs) at the APD stage would minimize risk from spills.
Air Quality	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Short and long term impacts due to emissions from construction equipment and fugitive dust from reasonably foreseeable development.
Climate and Climate Change	No impacts. Would result	No direct impacts from leasing. The proposed lease may contribute to the

Resource	No Action Alternative	Proposed Action
	in the continuation of the current land and resource uses.	installation and production of new wells, which may consequently lead to an increase in greenhouse gas (GHG) emissions.
Soils	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Potential for minor adverse impacts to soils from future reasonably foreseeable development associated with clearing, filling, and grading activities.
Water Resources – Surface and Groundwater, Floodplains, Riparian Areas, and Wetlands	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Potential for minor adverse impacts to water resources located on the parcel from future reasonably foreseeable development. SOPs, BMPs, and COAs at the APD stage would minimize risk to groundwater and surface water from spills.
Natural Resources (Wildlife and Vegetation, Invasives/Exotics, Special Status Species, Migratory Birds)	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing since there would be no surface disturbing activities. Potential for minor adverse impacts to wildlife and vegetation associated with reasonably foreseeable development associated with clearing for wellpad and road construction due to habitat loss and modification. No adverse impacts to threatened or endangered species, or habitat suitable for these species, are anticipated. Other wildlife species, including migratory birds, would experience loss of habitat and potentially direct disturbance impacts from reasonably foreseeable future development. These impacts are not expected to cause population level impacts to any species, including migratory birds.
Public Health and Safety	No impacts. No action would result in the continuation of existing public health and safety conditions.	No direct impacts from leasing sing there would be no surface disturbing activities. Potential future mineral development could result in exposure to contamination that may result in health conditions in sensitive or susceptible populations. However, federal, state, and local regulations, as well as health standards and protocols ensure that potential operations do not compromise public health and safety.
Cumulative Impacts	No impacts. Would result in the continuation of the current land and resource uses.	Negligible to minimal cumulative impacts are anticipated.

1.0 CHAPTER 1 – PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The Bureau of Land Management (BLM) has prepared this Environmental Assessment (EA) to evaluate the anticipated environmental impacts of leasing 50.15 acres of federal mineral estate to support potential future oil and gas development in Catahoula and Bienville Parishes, Louisiana (Figures 1-1, 1-2). Interested parties such as private individuals or companies may file Expressions of Interest (EOIs) to nominate parcels for competitive bid and leasing by the BLM. The BLM Eastern States is required to hold quarterly competitive lease sales to sell available oil and gas lease parcels.

The parcel evaluated as part of the Proposed Action consists of federal mineral estate underlying privately owned land. A federal lease is a legal contract that grants exclusive rights to the lessee to develop federally-owned oil and gas resources but does not authorize surface-disturbing activities or obligate the lessee to drill a well on the parcel in the future. Should the parcel be leased and a detailed plan for oil and gas development on the parcel be identified, the BLM would conduct future site-specific environmental analysis prior to any ground disturbing activities. The Proposed Action evaluated in this EA is described in further detail in Chapter 2.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the United States (U.S.) Department of the Interior (DOI) NEPA requirements (Department Manual 516, Environmental Quality) and the BLM NEPA Handbook H-1790-1. The information presented within this document serves as the basis for the BLM Authorized Officer to decide whether implementation of the Proposed Action would result in a significant impact to the environment. If significant impacts are expected, then the BLM would prepare an Environmental Impact Statement (EIS). If no significant impacts are expected, the BLM would issue a Finding of No Significant Impact (FONSI).

1.2 Location of the Proposed Action

EOI #2254, 2255, and 2261 are located in Catahoula and Bienville Parishes, Louisiana and contain 50.15 acres. The proposed project sites are located at: T6N, R7E, Sec. 6, Lot 2 and Lot 5 for EOI #2254 and 2255; T16N, R7W, Sec. 28 for EOI #2261 (see Figures 1-1 and 1-2).

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy, while minimizing adverse effects to natural and cultural resources. The BLM minimizes adverse effects to resources by identifying appropriate lease stipulations and notices, best management practices, and mitigations. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended [(30 U.S. Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas

leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which reduces the dependence of the U.S. on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

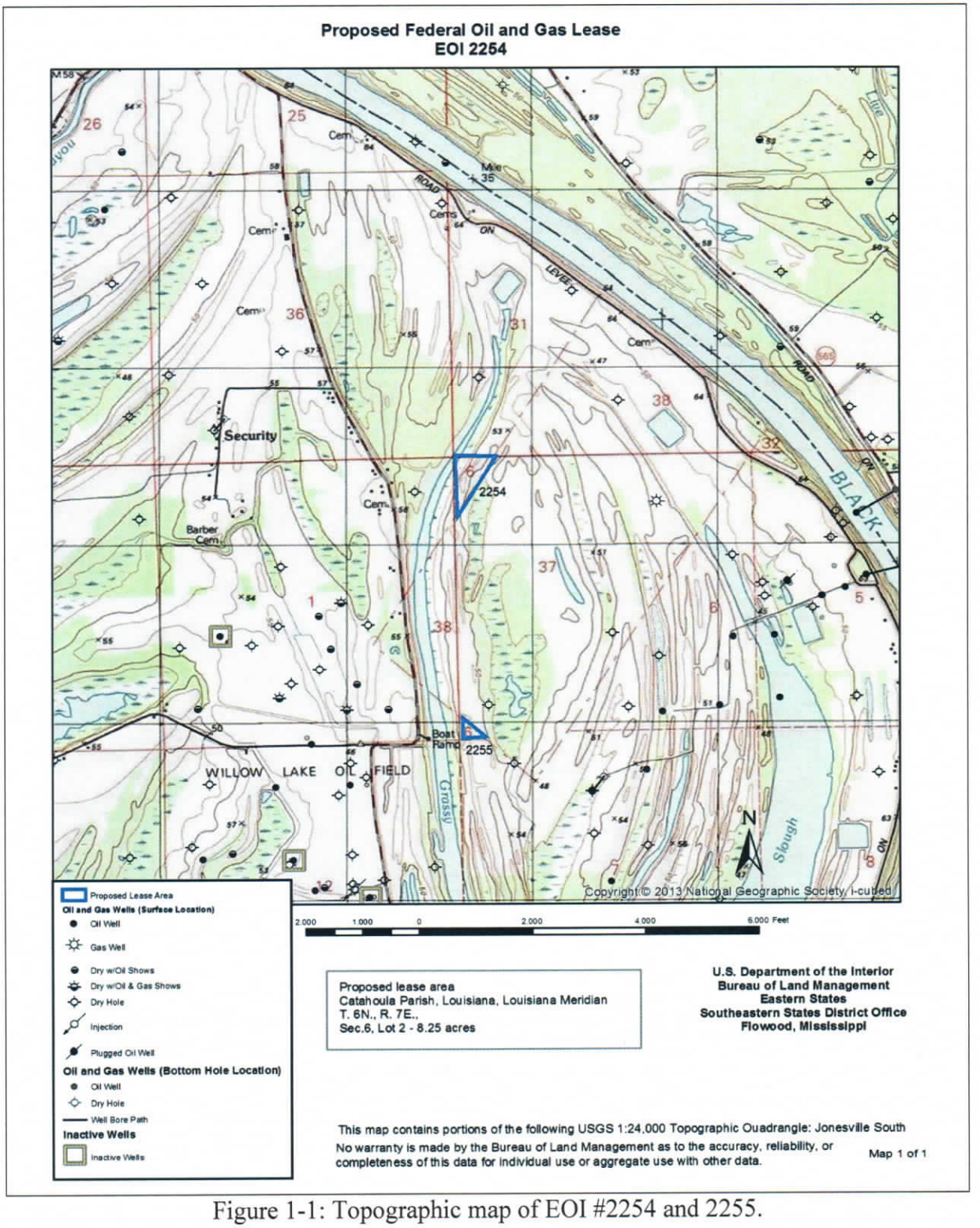

Figure 1-1: Topographic map of EOI #2254 and 2255.

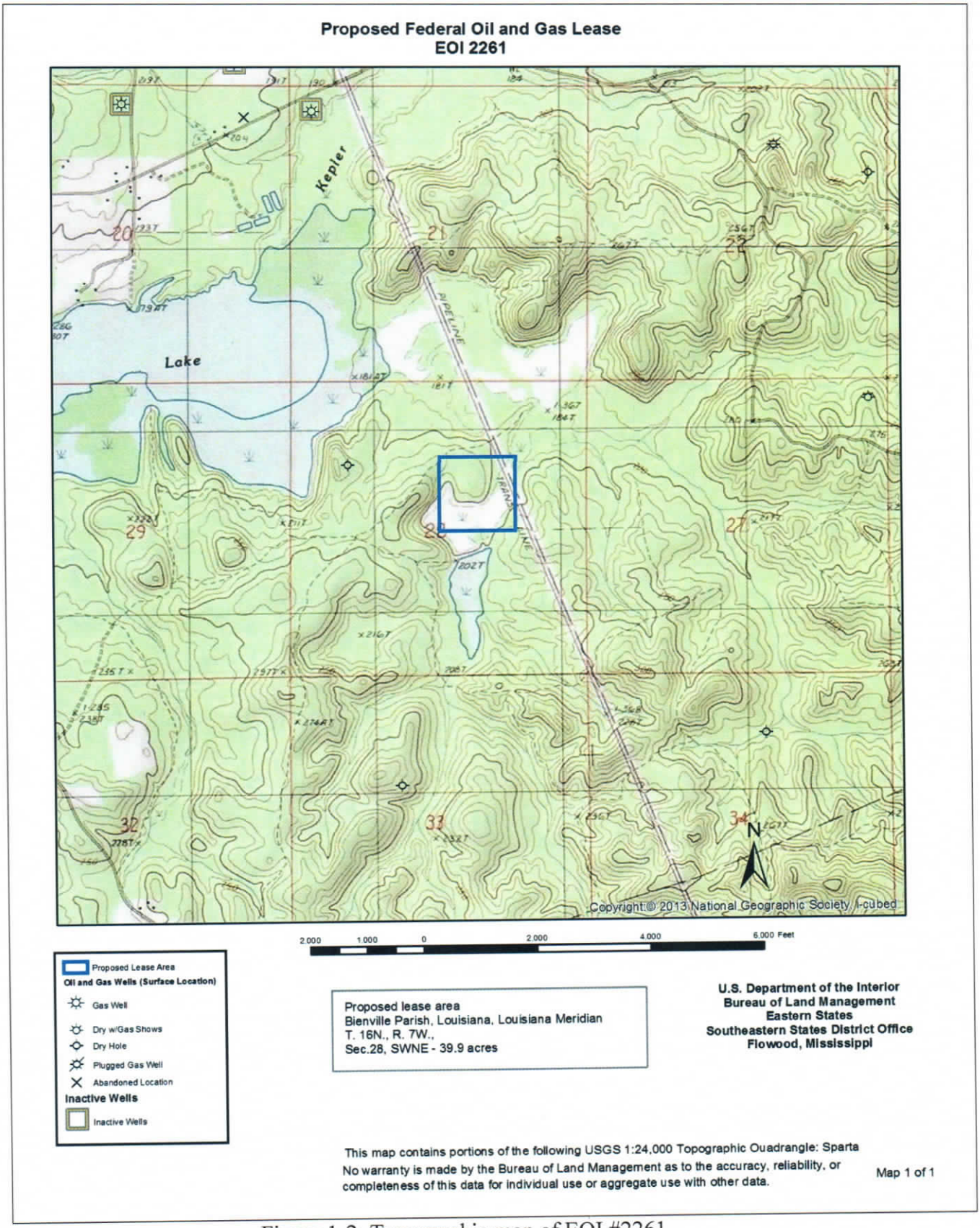

Figure 1-2: Topographic map of EOI #2261

The leasing of federal minerals is vital to the U.S. oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to EOI #2254, 2255, and 2261 consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

1.4 Land Use Plan Conformance

The Proposed Action does not conflict with any known state or local planning or zoning law, regulation, policy or ordinance. The proposed lease areas in Louisiana are not covered by a BLM Resource Management Plan; however, according to the regulations at 43 CFR 1610.8 (b) (1), this EA will be used as a basis for making a decision on the Proposed Action.

1.5 Relationship to Statutes, Regulations, and Other Plans

In addressing environmental considerations of the Proposed Action, the BLM is guided by relevant statutes (and their implementing regulations) and Executive Orders that establish standards and provide guidance on environmental and natural resources management and planning. These include but are not limited to the following:

- NEPA (1969) and the associated Council on Environmental Quality regulations at 43 CFR Parts 1500-1508
- FLPMA (1976) as amended and the associated regulations at 43 CFR Part 1600
- Mineral Leasing Act (MLA) (1920), as amended and supplemented (30 USC 181),
- National Historic Preservation Act (NHPA) (1966) as amended and the associated regulations at 36 CFR Part 800
- American Indian Religious Freedom Act
- Native American Graves Protection and Repatriation Act
- Endangered Species Act (ESA) (1973) as amended
- Clean Water Act (1977)
- Clean Air Act (1970) as amended
- Federal Onshore Oil and Gas Leasing Reform Act (FOOGLA)
- Migratory Bird Treaty Act (MBTA) (1918)
- Resource Conservation and Recovery Act (RCRA) (1976) as amended
- Executive Order (EO) 11988- Floodplain Management
- EO 119900 – Protection of Wetlands
- EO 12898 – Environmental Justice in Minority Populations and Low-Income Populations
- EO 13007 – Indian Sacred Sites
- Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews (BLM WO IM 2010-117)

1.6 Decision to be Made

The BLM must decide whether to lease the nominated parcels and if so, under what terms and conditions (Appendix A contains the proposed lease stipulations). The BLM's policy is to promote oil and gas development if it meets the guidelines and regulations set forth by NEPA and other subsequent laws and policies of the U.S.

1.7 Scoping and Public Involvement

1.7.1 Internal Scoping

A BLM interdisciplinary team consisting of a Land Law Examiner, Planning and Environmental Coordinator, Planning and Environmental Specialist, Geologist, GIS Specialist, and Archaeologist reviewed the EOI and prepared the EA. The interdisciplinary team used various sources of information to prepare the EA, including existing data inventories, online resources, and information collected onsite. The BLM conducted a site visit to EOI #2261 on January 17, 2017 and to EOI #2254 and 2255 on January 25, 2017 to document the physical characteristics of the site and collect information on baseline conditions. No major issues of concern were identified during internal scoping.

1.7.2 External Scoping

The BLM conducted and completed the required informal consultation with the U.S. Fish and Wildlife Service (USFWS) in compliance with the ESA Section 7 consultation requirements. The BLM also conducted and completed the required consultation with the Louisiana State Historic Preservation Office (SHPO) and Native American tribes. The BLM initiated informal consultation with USFWS on February 1, 2017. A concurrence letter was received on March 17, 2017 and is located in Appendix B. Consultation with the SHPO and coordination with the tribes occurred on January 6, 2017. The BLM received a concurrence letter from SHPO on February 1, 2017 (Appendix B). A response was received from 4 tribes. The Jena Band of Choctaw Indians response of January 30, 2017 (for EOI #2254 and 2255) stated that Catahoula Parish contained many significant sites of importance but that the tribe had no objection to the proposed action so long as a Section 106 consultation occurred prior to any ground disturbing activities. The Choctaw Nation of Oklahoma's response stated that; although Catahoula Parish lay within their area of historic interest, they were unaware of any cultural or sacred sites and that the Choctaw Nation Historic Preservation Department concurred with the finding of "no historic properties affected". Thlopthlocco Tribal Town replied on January 31, 2017, regarding EOI #2261, that they could not support the use of fracking techniques as impacts were not fully understood. Further, the response stated that they believed fracking had a detrimental impact on the subsurface that could impact water tables and they strongly objected to the use of fracking on federal lands. Thlopthlocco Tribal Town and the Alabama-Coushatta Tribe of Texas replied on February 8, 2017 that Bienville and Catahoula Parishes lay outside their respective area of interest. The following tribes were contacted to notify them of the Proposed Action and to request comments or concerns:

- Louisiana State Historic Preservation Officer
- Alabama-Coushatta Tribe of Texas
- Alabama Quassarte

- Choctaw Nation
- Coushatta Indian Tribe
- Jena Band of Choctaw
- Kialagee Tribal Town
- Mississippi Band Choctaw
- Thlopthlocco Tribal Town
- Tunica-Biloxi Tribe of Louisiana

All agency and tribal correspondence is included in Appendix B of this EA.

1.7.3 Public Involvement

The BLM invites public participation in the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables more informed decision making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are encouraged to participate in the decision making process.

The EA was made available for a 30-day review period, April 7, 2017 – May 6, 2017, on the Southeastern States District Office (SSDO) webpage. The lease sale notice is posted on the BLM Eastern States webpage and the National NEPA Register project webpage – typically 90 days prior to the sale but at a minimum of 45 days prior to the sale, which is required by regulation. Posting of the lease sale notice initiates a 30-day protest period for the proposed lease sale parcels.

2.0 CHAPTER 2 – DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* establish a number of policies for federal agencies, including "using the NEPA process to identify and assess reasonable alternatives to the Proposed Action that would avoid or minimize adverse effects of these actions on the quality of the human environment" (40 CFR 1500.2 (e)). This chapter provides a detailed description of the Proposed Action and alternatives carried forward for analysis in the EA.

2.1 Proposed Action

The Proposed Action is to lease 50.15 acres of federal minerals located in Catahoula and Bienville Parishes, Louisiana for potential future oil and gas development. The proposed leases would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities. Before a lease owner or operator conducts any surface disturbing activities related to the development of the lease to access the federal minerals, the BLM must first approve an application for permit to drill (APD) as specified in Title 43 CFR 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM also conducts additional site-specific NEPA analysis and the appropriate

consultations under the ESA and NHPA prior to approving the APD. Although there would be no surface disturbance from the action of leasing, this EA analyzes a reasonably foreseeable development (RFD) scenario to address the potential environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this point in time. For example, estimates can be made on the most likely number of wells that could be constructed, but the locations may change at the APD stage.

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, or does not make annual rental payments, or does not comply with the terms and conditions of the lease, or relinquishes the lease, then ownership of the minerals reverts back to the federal government.

2.1.1 RFD Scenario for Potential Oil and Gas Development for EOI #2254, 2255, and 2261

The three parcels totaling 50.15 acres consist of federally owned mineral estate underlying privately owned surface. Reasonably foreseeable activities that could occur as a result of future oil and gas development associated with leasing these parcels include surface disturbance associated with preparation for drilling including construction of a road, drilling pad, and reserve pit. The total surface disturbance predicted under the RFD scenario for the three leases is 14.97 acres (2.76 acres for EOI #2254, 3.22 acres for EOI #2255, and 8.99 acres for EOI #2261). All of the disturbance would occur within the section containing the leases for EOI #2254 and 2255 but not on the lease parcels themselves. The RFD scenario for EOI #2261 projects vertical wells would be drilled from one pad.

EOI #2254 projects surface disturbances of 0.92 acres for well pad and pit, 1.84 acres for access road, zero (0) for utility and/or pipeline R.O.W. for an initial disturbance of 2.76 acres. After a partial reclamation of 0.13 acres, the net disturbance is projected to be 2.63 acres.

EOI #2255 projects surface disturbances of 0.92 acres for well pad and pit, 2.3 acres for access road, zero (0) for utility and/or pipeline R.O.W. for an initial disturbance of 3.22 acres. After a partial reclamation of 0.13 acres, the net disturbance is projected to be 3.09 acres.

EOI #2261 projects surface disturbances of 6.94 acres for well pad and pit, 0.68 acres for access road, zero (0) for utility and/or pipeline R.O.W. for an initial disturbance of 8.99 acres. After a partial reclamation of 0.34 acres, the net disturbance is projected to be 8.65 acres.

Constructed access roads normally have a running surface width of approximately 30 feet; the length is dependent upon the well site location in relation to existing roads or highways. The average length of road construction is approximately 0.5 miles. Typically, seven acres are cleared and graded level for the construction of the drilling pad. If the well produces natural gas, and the flowline is in the road, another 0.5 acres may be affected by flowline construction. These disturbances are typical for private or federal ownership well pad locations. The excavation reserve pit is typically about five feet deep and is lined with bentonite clay to retain drilling fluids, circulated mud, and cuttings. Plastic or butyl liners (or its equivalent), that meet state standards for thickness and quality, are used on occasions when soils are determined incapable of holding pit fluids.

Drilling typically continues around the clock. The excavation reserve pit is typically about five feet deep and is lined with bentonite clay to retain drilling fluids, circulated mud, and cuttings. Plastic or butyl liners (or its equivalent), that meet state standards for thickness and quality, are used on occasions when soils are determined incapable of holding pit fluids. Once drilling is completed, excess fluids are pumped out of the pit and disposed of in a state authorized disposal site and the cuttings are buried. The RFD scenario assumes that wells would be drilled by rotary drilling using mud as the circulating medium. Mud pumps would be used to force mud down the drillpipe, thereby forcing the rock cuttings out the wellbore. Water would normally be obtained from a well drilled on the site, however, water could be pumped to the site from a local pond, stream or lake through a pipe laid on the surface. Approximately 1,500 barrels of drilling mud would be typically kept on the location. If a tract is adjacent to a producing field and water production is expected during the life of the field, separation, dehydration and other production processing may be necessary. Construction of facilities off the federal lease may be needed to handle this processing. Some processing or temporary storage may be necessary on site.

During well pad construction, the topsoil would likely be stockpiled for use during restoration activities. If the well is successful, the drill pad would be reduced to about 100 feet x 100 feet with the remaining surface area, including the reserve pit, re-graded and restored as per the surface owner/surface management agency requirements. A lease notice for the proposed leases encourages the use of non-invasive cover plants during all restoration and stabilization activities and is attached to the proposed leases. Final seed mixtures and plantings are determined with recommendations from BLM with approval of the land owner. The remaining 100 feet x 100 feet pad would be maintained for the life of the well. The life of a productive well may be 25 years. Following abandonment, the pad is subject to the same restoration parameters.

Appendix A contains the lease stipulations and lease notices for the parcels. These recommended lease stipulations and notices have been developed by BLM to provide general habitat protection and setbacks. Additional surveys or consultations may be required after site-specific proposals have been received by BLM during the development phase.

2.2 No Action Alternative

Under the No Action Alternative, the BLM would not offer for competitive bid or lease the proposed 50.15 acres of federal mineral estate for potential future oil and gas development. Not leasing the parcel would not meet the purpose of and need for the Proposed Action. CEQ guidelines (40 CFR 1502) stipulate that the No Action Alternative should be analyzed to assess any environmental consequences that may occur if the Proposed Action is not implemented and to serve as a baseline for comparing impacts of the Proposed Action. Therefore, the No Action Alternative has been retained for analysis in this EA.

2.3 Alternatives Considered but Dismissed

Since EOI #2254, 2255, and 2261 contain only 50.15 acres, BLM did not consider any other alternatives aside from the Proposed Action and the No Action Alternative.

3.0 CHAPTER 3 – DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter describes the environment that would potentially be affected by implementation of the Proposed Action, as required by CEQ regulations for implementing NEPA (40 CFR Parts 1500-1508). The discussion in this chapter focuses on the relevant resources and issues regarding the Proposed Action. Only those elements of the affected environment that have the potential to be affected are described in detail.

Based on a review of the context and scale of the Proposed Action, the following resources are discussed in detail in this EA: Land Use, Visual/Noise/Recreation Resources, Socioeconomics and Environmental Justice, Cultural Resources and Native American Concerns, Minerals and Mineral Development, Wastes, Soils, Air Resources, Water Resources – Surface/Ground Water, Wetlands/Riparian Areas/Floodplains and Natural Resources including; Invasive/Exotic Species, Vegetation and Wildlife, Special Status Species, Migratory Birds of Concern, and Public Health and Safety.

The following resources have been eliminated from further discussion from the EA, because either the resource is not present or there are no anticipated effects to the resource. A brief summary explaining why the resource was eliminated is also provided below.

- Lands with Wilderness Characteristics, Areas of Critical Environmental Concern, Wilderness Study Areas, Wild and Scenic Rivers. None of these resources are present on or near the proposed lease parcels.

3.1 Land Use

EOI #2254 and 2255

EOI #2254 and 2255 are located in Catahoula Parish, Louisiana in the Southern Backswamps Level IV ecoregion of the larger Mississippi Alluvial Plain ecoregion (Level III) in the Gulf Coastal Plain province, which encompasses all of Louisiana (LDEQ 2004). According to the U.S. Geological Survey (USGS), this ecoregion consists of flat plains with depressions containing ponded wetlands, swamps and lakes. Forested wetlands, deciduous forest, cropland with soybeans, rice, corn and sugarcane, as well as aquaculture, and minor pecan orchard, hayland, and pasture areas occur. Potential natural vegetation is mapped as southern floodplain forest (Daigle, J.J., et al., USGS 2006).

Jonesville is located ~6 miles north of EOI #2254 which according to 2015 U.S. Census data, had a population of 2,187. The parcels are located 6 miles south of Louisiana State Highway 84 and ~16.4 miles west of the Mississippi River and the Mississippi state line. The two EOIs are only separated north to south by approximately 0.7 mile (Figure 3-1). Both parcels, 2254 and 2255, consist of over 90% cleared agricultural field except for a small portion of Grassy Lake on the northwest corner of EOI #2254 with fringe bottomland hardwood trees. Grassy Lake borders each parcel on the west (Figure 3-1). The site is within the Mississippi River floodplain. EOI #2255 is entirely composed of an agricultural field (formerly cotton (*Gossypium hirsutum*) in 2016) currently top-sown in winter wheat (*Triticum aestivum*) in preparation for spring 2017 planting.

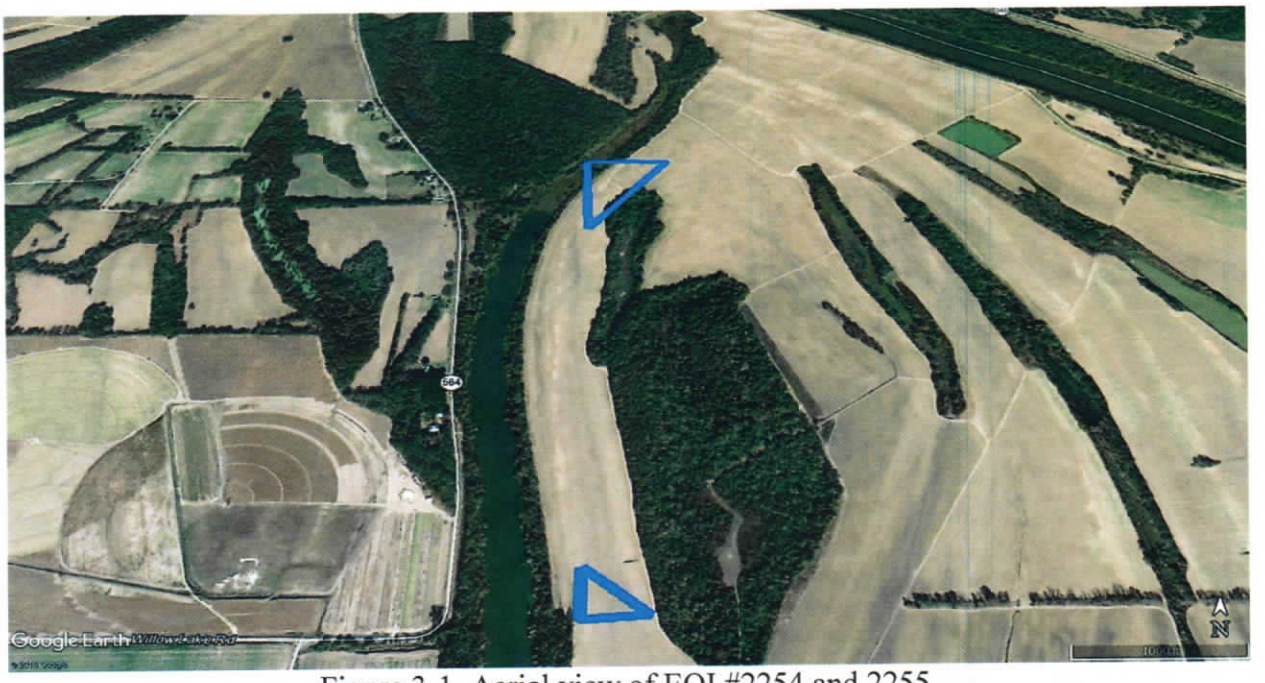

Figure 3-1. Aerial view of EOI #2254 and 2255.

A reconnaissance site visit was conducted for EOI #2254 and 2255 on January 25, 2017. The majority of the acres comprising EOI #2254 and 2255 are open agricultural fields. The surrounding area within a two-mile buffer exhibits typical land use patterns in the Mississippi alluvial floodplain. This use pattern contains mainly cleared fields for intensive agriculture use, bordered by small forested wetland areas too wet to farm (Figure 3-2).

Figure 3-2. Aerial view of proposed parcels EOI #2254, 2255 and surrounding area.

EOI #2261

EOI #2261 is located in Bienville Parish, Louisiana in the South Central Plains (Level III) ecoregion; Southern tertiary uplands (Level IV). According to the USGS, this ecoregion consists of hilly uplands formed by extensive dissection of tertiary alluvial, deltaic deposits of sand, silt, clay, and gravel bedrock strata. Highly diverse natural communities exist including longleaf pine woodlands (historically dominant), longleaf pine savannas, hardwood slope forests with beech and magnolia; calcareous forests and prairies, bogs containing pitcher plants and orchids, and sandstone glades with pines and drought tolerant oaks. The majority use is for forestland, pine plantations, forested wetlands, and some pasture and hay-producing land (Daigle, J.J., et al., USGS 2006).

Bienville is the closest town to EOI #2261 and is located ~6.4 miles east of the parcel which according to 2010 U.S. Census data, had a population of 211. Bienville Parish is a rural area – with the entire parish population, according to the same Census data, being 14,353. Shreveport is the nearest large city with a population of 199,311. The parcel is located ~1.7 miles east of Kepler Creek Lake. The parcel is located ~1.5 miles south of County Road 507 in the center of a large forested area bounded by County Road 4 on the south, County Road 9 on the east, and County Road 507 (Kepler Road) again on the west. EOI #2261parcel is pine forestland except for a wetland in the southern portion and a gas pipeline running north-south that transects the northeastern corner (Figure 3-3). The parcel occupies a lowland site located in an otherwise upland area. Mt. Driskill, the highest natural point in Louisiana, is located ~12 miles to the northeast.

Dominant vegetation consists of loblolly pine in the north and central parts of the parcel. The southern half of the parcel is a fringe of mixed pine-hardwood fingers surrounding a chain of beaver-pond wetland complexes. The surrounding area within a two-mile buffer contains mainly forested woodlands, primarily commercially-planted pine plantations (Figure 3-4).

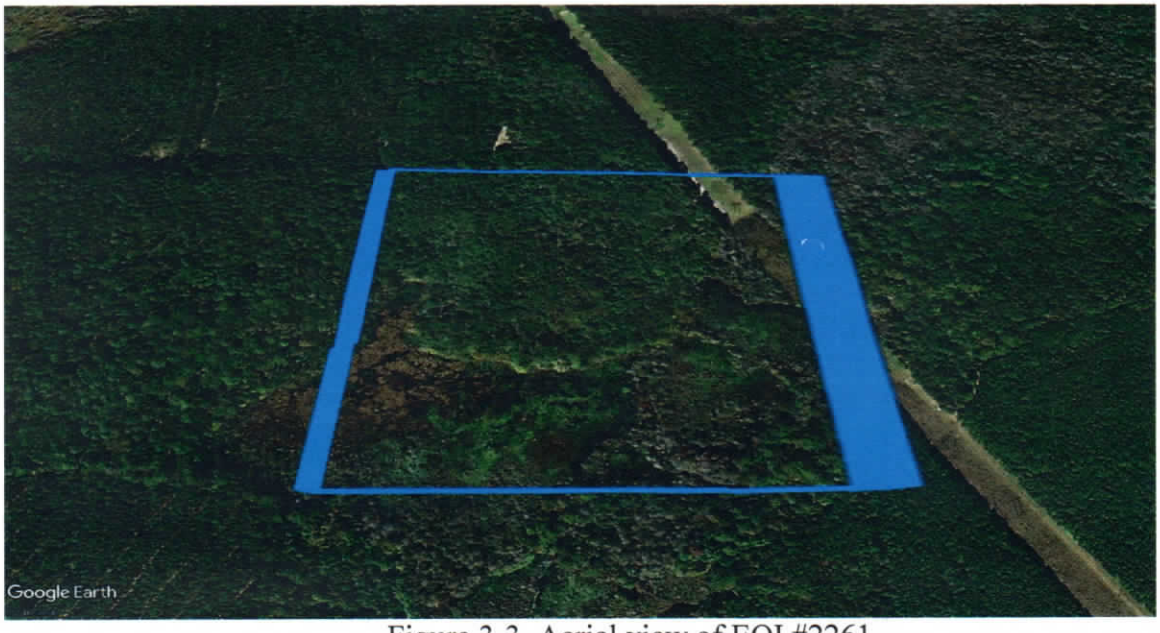

Figure 3-3. Aerial view of EOI #2261

Figure 3-4. Aerial view of proposed parcel EOI #2261 and surrounding area.

3.2 Visual/Noise/Recreation Resources

3.2.1 Visual Environment

The visual environment of the parcel and adjacent areas is rural and minimally developed with generally flat topography. The proposed lease parcels, EOI #2254 and 2255, are cleared agricultural fields. The proposed lease parcel EOI #2261 is half forested and half wetland. The surrounding areas on all parcels contain a mixture of cleared and forested areas, with minimal development except for forestry and agricultural activities.

3.2.2 Noise Environment

The extent to which individuals are affected by noise is controlled by several factors, including the duration and frequency of sound; the distance between the source and the receptor; the intervening natural or man-made barriers or structures; and the ambient environment. Typically, levels of noise are measured in units called decibels (dB). Because the human ear cannot perceive all pitches or frequencies equally well, noise measurements are adjusted or weighted to compensate for the human lack of sensitivity to low-pitched and high-pitched sounds. The A-weighting scale closely resembles the frequency response of the human ear and, therefore, the adjusted unit of measurement, the A-weighted decibel, or dBA, is used to characterize noise, and to quantify the impact of noise, produced by transportation (e.g., vehicle traffic) and construction activities.

Construction equipment generates between 70 and 115 decibels (dB). Typical noise associated with oil and gas activities include the actual drilling, the pumps (that extract the oil), the engines, the compressor and the vehicle traffic to and from the site. Noise associated with oil and gas

development typically continues non-stop for 30 days for each well that is constructed, but after this initial development period the noise is expected to subside.

No noise ordinance exists for rural areas of Catahoula and Bienville Parish, Louisiana.

3.2.3 Recreation Resources

Access to recreational resources at the proposed sites is limited because they are on private property. The immediate surrounding area also primarily consists of private lands. Hunting is likely common on and surrounding the project area.

3.3 Socioeconomics and Environmental Justice

3.3.1 Socioeconomics

Catahoula Parish, Louisiana consists of 739 square miles (U.S. Census Bureau: State and County Quick Facts, 2015). The 2015 estimated population for the county is 10,147, which is a 2.5% decrease from the 2010 census. The population per square mile in 2010 was 14.7 people. The median household income in 2011 – 2015 was $34,904.00. Catahoula Parish had 197 employer establishments in 2014 with 1,557 people employed.

Bienville Parish, Louisiana consists of 811.3 square miles (U.S. Census Bureau: State and County Quick Facts, 2015). The 2015 estimated population for the county is 13,786, which is a 4.0% decrease from the 2010 census. The population per square mile in 2010 was 17.7 people. The median household income in 2011 – 2015 was $32,876.00. Bienville Parish had 225 employer establishments in 2014 with 3,460 people employed.

Table 3-1. Socioeconomic data (2011-2015) for Bienville and Catahoula Parishes

Parish	Median Annual Income ($)	Poverty Level (%)
Bienville Parish	32,876	25.4
Catahoula Parish	34,904	27.2
Louisiana	45,047	19.6

(U.S. Census Bureau: State and County Quick Facts, 2010-2015).

3.3.2 Environmental Justice

EO 12898 (1994) formally requires Federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs agencies to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority or low-income populations.

Minority populations as defined by the CEQ under the 1997 Environmental Justice guidance under NEPA include individuals in the following population groups: African American, American Indian or Alaskan Native, Asian or Pacific Islander, and Hispanic. A minority

population is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater..." (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). Low-income populations are determined by the U.S. Census Bureau based on poverty thresholds developed every year.

U.S. Census data is used to determine whether the populations residing in the analysis area constitute an "environmental justice population" through meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status; or
- The percentage of population that is of minority or low-income status is at least 10 percentage points higher than for the entire state of Louisiana.

Table 3-2. 2015 Population by Race (%) for Bienville and Catahoula Parishes

Parish	White	Black	Asian	American Indian	Native Hawaiian
Bienville Parish	56.2	41.5	0.4	0.4	Z
Catahoula Parish	66.7	31.7	0.1	0.5	Z
Louisiana	63.2	32.5	1.8	0.8	0.1

Z Value greater than zero but less than half unit of measure shown.
(U.S. Census Bureau: State and County Quick Facts, 2010-2015).

3.4 Cultural Resources and Native American Concerns

3.4.1 Cultural Resources

A cultural resource is a broad term that refers to areas of traditional significance, use and the remains of past and current human activity. These resources may be the physical remains of a prehistoric or historic archeological site or a place of traditional cultural significance or use. A Traditional Cultural Property (TCP) refers to the connection between places on the landscape and a group's traditional beliefs, religion, or cultural practice. Because cultural resources are nonrenewable and easily damaged, laws and regulations exist to help protect them.

The NHPA, as amended, and its implementing regulations require that federal agencies consider the effects of their undertakings on "historic properties." The term "historic properties" refers to cultural properties, both prehistoric and historic, that are eligible for listing in the National Register of Historic Places (NRHP). Traditional sacred places and traditional use areas of tribes are also considered cultural historic properties that may be eligible for the NRHP, because of their association with cultural practices and beliefs rooted in history and their importance in maintaining the cultural identity of ongoing American Indian communities. Consultations about these uses and places are governed and/or mandated by the NHPA, as amended in 1992 (USC 470 et seq.), the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.) and EOs 13007, 13175, 13084, and 13647. Federal agencies consider the effects of their management

activities on historic properties by first determining the area of potential effect, then conducting literature searches and field surveys to locate cultural properties. Additionally, they consult with American Indian Tribes and other interested parties to determine whether TCPs are within the area of potential effect.

The proposed parcels have not been surveyed. There are recorded cultural sites within one mile of all three EOIs. The proposed lease parcels may have undiscovered sites that would qualify as historic properties (36 CFR 61). A professionally conducted survey for historic properties would add information on human utilization of this area. The Louisiana State Historic Preservation Officer (SHPO) concurs with BLM's recommendation for a Phase I survey prior to any ground disturbing activities associated with potential future oil and gas development.

3.4.2 Native American Concerns

Federally recognized Native American Tribes/Nations have been contacted about this proposed undertaking (see Section 1.8.2). Known sites of Native American religious activities or traditional cultural properties on theses parcels have not been identified, at present, on these parcels. The area has not been surveyed for cultural resources. Religious sites or sites of cultural importance to Native Americans may be present. If any such sites are present, access would be by an agreement between the landowner and the Native Americans. The BLM has no authority over access to these parcels. The BLM's responsibility is limited to the area of surface disturbance if or when a proposal for development is submitted. Tribal responses have asked "that work is stopped and our office contacted immediately in the event that Native American artifacts or human remains are encountered" and that consultation occurs prior to any ground disturbing activities.

3.5 Minerals and Mineral Development

The objective horizon for EOI #2254 and 2255 is Paleocene – Eocene Wilcox formation sands. The commodity is crude oil and associated natural gas. The objective horizon for EOI #2261 is Lower Cretaceous Hosston through Jurassic Bossier/Haynesville sands and limes and the commodity is natural gas and associated condensate.

To access the federal minerals for EOI #2254 and 2255, wells would be drilled vertically. All of the drilling will occur within the section containing EOI #2254 and 2255 but not on the lease parcels themselves. Wells for EOI #2254 and 2255 in the Wilcox formation would not require hydraulic fracturing. To access the federal minerals for EOI #2261, depending on objective formation, wells would be drilled either vertically or horizontally. Hosston down through Rodessa and Cotton Valley formations are typically vertically drilled wells and use conventional fracking methods. Wells that continue through to Bossier/Haynesville formations require horizontal wells and the use of high volume (HV) fracking technology. Wells for EOI #2261 may require conventional or HV hydraulic stimulation/fracturing in order to establish commercial production. Hydraulic stimulation occurs after a well has been drilled to a particular depth vertically and possibly drilled a certain distance horizontally through the targeted geologic zone (Figure 3-5). Steel pipe (casing) would be inserted in the well bore and perforated within the target zone(s) that contain oil or gas, enabling production out of the targeted zone(s) when

the fracturing fluid is injected at high pressure into the well flowing through the perforations. Eventually, the targeted formation cannot absorb the fluid as quickly as it is being injected and at this point, the pressure created causes the formation to crack or fracture. Once the fractures have been created, injection ceases and some quantity of the fracturing fluids begins to flow back to the surface. Materials called proppants (e.g., usually sand or ceramic beads), which were injected as part of the fracturing fluid mixture, remain in the target formation to hold open the fractures.

EOI #2254 and 2255 wells do not require fracking. A small volume (420 gallon) acid wash may be used in order to clean perforations. For EOI #2261, wells would require conventional or HV fracking depending on completed formation. Water use is estimated at 420,000 to 10,000,000 gallons per well. Sand use is estimated to be 500,000 to 15,000,000 pounds.

Some studies have shown that anywhere from 20-85% of fracturing fluids may remain underground. Used fracturing fluids that return to the surface are often referred to as flowback, and these wastes are typically stored in open pits or tanks at the well site prior to proper disposal or can be reused in developing other wells.

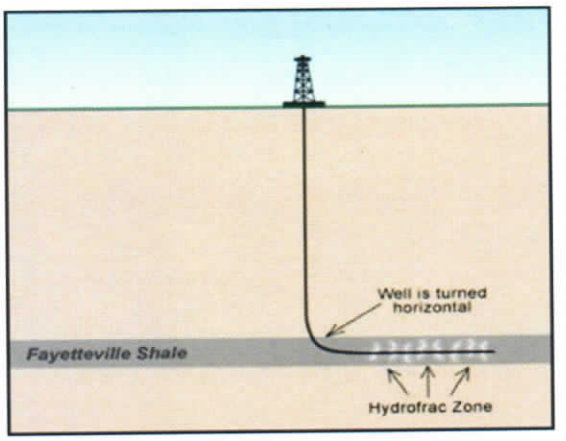

Figure 3-5. Diagram of hydraulically fracturing a well.

3.6 Wastes

The Resource Conservation and Recovery Act (RCRA) of 1976 established a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The U.S. Environmental Protection Agency (USEPA) regulations define solid wastes as any "discarded materials" subject to a number of exclusions. On January 6, 1988, USEPA determined that oil and gas exploration, development and production wastes would not be regulated as hazardous wastes under the RCRA. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, deals with the release (spillage, leaking dumping, accumulation, etc.), or threat of release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA exempt contaminants could be subject to regulations as a hazardous substance under CERCLA.

During the site visit, no hazardous or solid waste disposal sites were located on the proposed lease parcel. Should the parcel be leased and the federal minerals developed, generation and temporary storage of waste materials (solid and liquid) would likely occur near the lease parcels.

3.7 Soils

There is one primary soil type found on EOI #2254 and 2255; a Tensas-Alligator complex of clayey alluvial loams which comprises over 90% of the parcels. These are very deep, poorly drained, very slowly permeable soils found in backswamps, swales of meander scrolls, sloughs, and floodplains on the meander belts of the Mississippi River and its tributaries in the Lower Mississippi Valley. It has a parent material of mixed clayey-loamy alluvium typically containing very high clay particle content. Typical slopes are 0-2%. This type of soil is often precision landformed to a consistent uniform grade for furrow irrigation in intensive agriculture (Soil Survey 2016).

There are two primary soil types found on EOI #2261; Bienville loamy fine sand, 1-5% slopes, and Sacul fine sandy loam, 5-12% slopes. Bienville loamy fine sand comprises ~45% of the parcel and is found on stream terraces in the Gulf Coastal Plains. It is a very deep, excessively drained, moderately rapidly permeable soil formed in sandy coastal plain sediments on level to gently sloping stream terraces. Sacul fine sandy loam consists of very deep, moderately well drained, slowly permeable soils that make up ~30% of the parcel. Sacul dominant slopes are 2-25% but exhibit ranges from nearly level to 40% on steeply sloping uplands of the Western and Southern Coastal Plains. Parent material formed from Tertiary Age sediments that were acid, loamy, and clayey. Both Bienville and Sacul soils are used primarily for woodland, dominantly mixed hardwood and pine with minimal area in pasture and agriculture (Soil Survey 2016).

3.8 Air Resources

3.8.1 Air Quality

In the general area of the parcel, the primary sources of air pollution are dust from blowing wind on disturbed or exposed soil, exhaust emissions from motorized equipment, oil and gas development, agriculture, and industrial sources. The USEPA was given the authority for air quality protection with the provision to delegate this authority to the state as appropriate under U.S. States law. The Louisiana Department for Environmental Quality (LDEQ) has been delegated the authority for air quality protection in Louisiana. The Clean Air Act of 1970, as amended, requires the establishment of National Ambient Air Quality Standards (NAAQS). NAAQS pollutants include carbon monoxide (CO), nitrogen dioxide ($N0_2$), ozone (03), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide ($S0_2$), and lead (Pb). The NAAQS pollutants are monitored in Louisiana by the LDEQ. The Clean Air Act identifies two types of NAAQS. Primary standards set limits in order to protect public health, including the health of "sensitive" populations (such as asthmatics, children, and the elderly). Secondary standards set limits in order to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation and buildings. Both primary and secondary standards are currently in effect (Table 3-3).

Table 3-3. National Ambient Air Quality Standards.

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour (1)	None	
	35 ppm (40 mg/m^3)	1-hour (1)		
Lead	0.15 µg/m^3 (2)	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m^3	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 ppb (3)	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour (4)	None	
Particulate Matter (PM_{10})	150 µg/m^3	24-hour (5)	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual (6) (Arithmetic Average)	Same as Primary	
	35 µg/m^3	24-hour (7)	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour (8)	Same as Primary	
	0.08 ppm (1997 std)	8-hour (9)	Same as Primary	
	0.12 ppm	1-hour (10)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour (1)
	0.14 ppm	24-hour (1)		

Note:

(1) Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.

(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

(5) Not to be exceeded more than once per year on average over 3 years.

(6) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.

(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).

(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008).

(9) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes
rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) USEPA is in the process of reconsidering these standards (set in March 2008).

(10) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.

Air quality in a given region can be measured by its Air Quality Index (AQI) value. The AQI is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. The AQI is a national index and the air quality rating is an important indicator for populations sensitive to air quality changes. The closest air monitoring station to the parcel is located in Alexandria, Louisiana. On December 20, 2016, the AQI in Alexandria was acceptable with an AQI of 42 for particulate matter ($PM_{2.5}$) (AirNow 2016).

3.8.1.1 Visibility

Visibility, also referred to as visual range, is a subjective measure of the distance that light or an object can clearly be seen by an observer. Light extinction is used as a measure of visibility and is calculated from the monitored components of fine particle mass (aerosols) and relative humidity. It is estimated that the average natural background visibility range for the eastern U.S. varies from 65 to 121 miles. Visibility range information is not available for Louisiana.

There are three classifications of areas that attain NAAQS: Class I, Class II, and Class III. Congress established certain national parks and wilderness areas as mandatory Class I areas where only a small amount of air quality degradation is allowed. Since 1980, the Interagency Monitoring of Protected Visual Environments network has measured visibility in Class I areas. These are managed as high visual quality under the federal visual resource management program. The Clean Air Act 1997 amendment declared "as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas…from manmade air pollution" 42 USC Section 7491(a)(1).25. All other areas of the U.S. are designated as Class II, which allow a moderate amount of air quality degradation. No areas of the U.S. have been designated Class III, which would allow more air quality degradation. The Clean Air Act gives federal managers the affirmative responsibility, but no regulatory authority, to protect air quality-related values, including visibility, from degradation.

Breton National Wildlife Refuge (NWR) is the only Class I area in Louisiana. It was originally established in 1904 as a refuge and breeding ground sanctuary for migratory birds and other wildlife (USFWS 2013). Breton NWR is composed of the Chandeleur Islands and North and South Breton Islands in the Gulf of Mexico; accessible only by boat (USFWS 2013). This ~6,000 acre (above high tide level) NWR is located in Plaquemines and St. Bernard Parishes, Louisiana. Congress designated Breton NWR as a wilderness in 1975 and a Class I air quality area in 1977 (USFWS 2013). The northern tip of Breton NWR is located ~ 200 miles southeast of EOI #2254 and 2255 in Catahoula Parish and ~295 miles southeast of EOI #2261 in Bienville Parish.

Prevention of Significant Deterioration (PSD) increments limit air quality degradation and ensure that areas with clean air continue to meet NAAQS, even during economic development. The PSD program goal is to maintain pristine air quality required to protect public health and welfare from air pollution effects and "to preserve, protect and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreation, scenic or historic value." PSD increments have been established for NO_2, SO_2, and PM_{10}. Comparisons of potential PM_{10}, NO_2, and SO_2

concentrations with PSD increments are intended only to evaluate a threshold of concern. The allowable PSD increment depends on an area's classification. Class I areas have lower increments, due to their protected status as pristine areas. PSD increment data is currently unavailable for Louisiana.

3.8.1.2 Atmospheric Deposition

Atmospheric deposition refers to processes in which air pollutants are removed from the atmosphere and deposited into terrestrial and aquatic ecosystems. Air pollutants can be deposited by precipitation (rain and snow) or the gravitational settling of gaseous pollutants on soil, water, and vegetation. Much of the concern about deposition is due to secondary formation of acids and other compounds from emitted nitrogen and sulfur species, such as oxides of nitrogen (NOx) and SO_2, which can contribute to acidification of lakes, streams, and soils and affect other ecosystem characteristics, including nutrient cycling and biological diversity.

The accurate measurement of atmospheric deposition is complicated by contributions to deposition by several components including but not limited to rain, snow, cloud water, particle settling, and gaseous pollutants. Deposition varies with precipitation and other meteorological variables (e.g., temperature, humidity, winds, and atmospheric stability), which in turn, vary with elevation and time.

3.8.2 Climate

3.8.2.1 Local Climate

Louisiana has a humid climate influenced by and as a result of its location; sub-tropical latitude with the Gulf of Mexico to the south, the North American continental landmass to the north, and lying at the mouth of the Mississippi River valley (LDEQ 2004). The climate is characterized by long, warm summers and short, mild winters. Prevalent winds from the south/southeast bring warm, moist air from the Gulf, resulting in abundant rainfall (LDEQ 2004). The statewide annual average precipitation varies from 48 inches in the northwestern part of the state near Shreveport to 64 inches in the southeastern coastal plains near Thibodaux (LDEQ 2004). Summer temperatures range from 85 degrees Fahrenheit (°F) to 95 °F during the afternoon and 65 °F to 75 °F in the early morning. Winters are generally mild, and only rarely are there days when the temperature fails to rise above freezing. Average winter temperatures range from 55°F to 65 °F in the afternoon and from 40°F to 50 °F in the early morning hours.

Louisiana lies in the path of hurricanes moving northward from the Gulf of Mexico during the late summer and fall. Hurricane season is from June through November (NetState 2016). Rainfall amounts vary with the storms, ranging from a trace to a record 22 inches for a 3-day period in 1922. Moderate to severe flooding is sometimes associated with these storms (USDA 1999). Hurricane Katrina hit the Gulf Coast in 2005 and was the costliest natural disaster as well as one of the five deadliest hurricanes in the history of the U.S. At least 1,245 people died in the hurricane and subsequent floods in multiple states. Tornadoes can develop any time of the year, but the primary season is from March to May. Their occurrence is most common in April. A

second tornado season takes place from November to January. Intense, localized rainfall is often associated with these storms (USDA 1999).

3.8.2.2 Global Climate

Scientific research shows that global climate is influenced by many factors including natural processes (i.e., changes in the sun's intensity or changes in ocean circulation) and human activities (such as burning fossil fuels and increased urbanization) (Intergovernmental Panel on Climate Change [IPCC] 2013). History shows that in the past, the earth has gone through a number of ice ages with periods of warming and droughts between periods. The most recent Ice Age ended around 13,000 years ago and the climate has warmed and dried since then. The warming and drying has not been continuous. However, the rate at which atmospheric CO_2 concentrations has risen in the past years appears to correspond with observed temperature changes.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies 2007). In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2008) has confirmed these findings, but also indicated that there are uncertainties regarding how changes in climate may affect different regions.

Ongoing scientific research is studying the potential effects of certain types of pollutants on global climate, particularly those that are "greenhouse gases (GHG)" (composed of carbon dioxide, CO_2; methane, CH_4; nitrous oxide, N_2O; water vapor; and several trace gasses). Through complex interactions on a regional and global scale, scientific research shows that these pollutants cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space.

Some GHGs such as CO_2 occur naturally and emit into the atmosphere through natural processes and human activities. Human activities create and emit other GHGs (e.g., fluorinated gases). The primary GHGs that enter the atmosphere as a result of anthropogenic activities include CO_2, CH_4, N_2O, and fluorinated gases such as hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF). Fluorinated gases are powerful GHGs that emit from a variety of industrial processes including production of refrigeration/cooling systems, foams and aerosols; however, fluorinated gases are not primary to the activities authorized by the BLM.

Although research shows a relationship between GHG and temperature, the variety of scientific tools designed to predict changes in local or global climate limits the ability to definitively identify potential future impacts on climate. Currently, the LDEQ does not have regulations regarding GHG emissions.

3.9 Water Resources - Surface/Ground Water

The Louisiana Department of Natural Resources, Office of Conservation (LDNROC) regulates oil and gas operations in the state of Louisiana. The LDNROC has the responsibility to gather oil

and gas production data, permit new wells, establish pool rules and oil and gas allowables, issue discharge permits, enforce rules and regulations of the division, monitor underground injection wells, and ensure that abandoned wells are properly plugged and the land is responsibly restored. The LDEQ administers the major environmental protection laws. The LDEQ administers all Water Quality Act regulations pertaining to surface and groundwater (except sewage not present in a combined waste stream). According to the LDEQ, produced water if predictable in salt concentration, can be used for drilling and completion and possibly cementing.

3.9.1 Surface Water

Surface water hydrology within the area is typically influenced by geology, soil characteristics, precipitation and vegetation. The Tensas/Black River flows south ~ 1 mile or less to the east of EOI #2254 and 2255. Grassy Lake is the western boundary of both proposed parcels. The Mississippi River lies ~16 miles to the east. Several other large water bodies are located in the vicinity. For EOI #2261, surface water exists on the tract as a wetland on the southern portion of the parcel. Nearby surface water also exists as the 1,721 acre Kepler Creek Lake, ~ 2 miles west, fed by Kepler Creek flowing in from the north. Once leaving the spillway on the south end of the lake, Kepler Creek flows for four miles and joins Black Lake Bayou, one of Louisiana's Natural and Scenic Rivers. Lake Bistineau and the Red River are located ~18 miles and 26 miles west, respectively, of EOI #2261.

3.9.2 Groundwater Resources

Louisiana lies entirely within the Gulf Coastal Plain physiographic province. Louisiana has a total of nine aquifers that are divided into five major physiographic regions of the state: Coastal Marsh, Mississippi Alluvial Valley, Red River Valley, Terraces, and Hills (LDEQ 2004).

The Mississippi Alluvial Valley region is supplied by the Upper Mississippi alluvial aquifer system underlying EOI #2254 and 2255 in Catahoula Parish. It is of Holocene and Pleistocene age. The alluvium consists of fining upward sequences of gravel, sand, silt and clay that confine the aquifer, primarily used for agriculture and aquaculture, in varying thicknesses and coverage (Daigle, J.J., et al. USGS. 2006).

EOI #2261, in the South Central Plains (Level III) ecoregion, is supplied by the Carrizo-Wilcox and the Terrace aquifers. Terrace aquifers are of Pleistocene age and overlain by Holocene alluvium that is poorly to well sorted sand and gravel grading to fine sand in upper layers and unconfined in most areas. Carrizo-Wilcox aquifer systems are Carrizo sands of Eocene age and the undifferentiated Wilcox group of Eocene and Paleocene age. The Wilcox group deposits are the oldest freshwater-producing deposits in the state and characterized by complex sequences of fine-textured sands, sandy silts, sandy to silty clays and lignite. Carrizo deposits are discontinuous, fine to medium grained sands and lignite. The Carrizo-Wilcox aquifer yields fresh ground water for domestic and public supplies (Daigle, J.J., et al. USGS. 2006). Groundwater hydrology within the areas is influenced by geology and recharge rates. Groundwater quality and quantity can be influenced by precipitation, water supply wells, and various disposal activities. Most onshore produced water is injected deep underground for either enhanced recovery or disposal. With the passage of the Safe Drinking Water Act in 1974, the subsurface injection of

fluids came under federal regulation. In 1980, the USEPA promulgated the Underground Injection Control regulations. The program is designed to protect underground sources of drinking water.

Areas of poor water quality can result from both natural and anthropogenic sources. Natural sources of contamination are typically regional in extent and are related to water-rock interactions. Anthropogenic impacts include both point and nonpoint sources of contamination. Nonpoint sources can result in large areas of impact, although contaminant concentrations typically are significantly lower than point sources, and the contaminants typically represent soluble, non-reactive species. Point sources of contamination often result in elevated levels of contaminants that exceed federal maximum contaminant levels; however, the extent of contamination normally is confined to a small area, with little to no offsite migration or impact on receptors (LDEQ 2008).

3.10 Wetlands/Riparian Areas/Floodplains

Wetland habitats provide important wintering and migration habitat for several species of migratory birds. Wetlands also provide a link between land and water and are some of the most productive ecosystems in the world. EO 11990 on the Protection of Wetlands provides an opportunity for early review of federal agency plans regarding new construction in wetland areas. Under EO 11990, each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

EOI #2254 and 2255 lie within the Mississippi River floodplain. The Mississippi River lies ~16 miles to the east. The Black River flows south <1 mile east of EOI #2254 and 2255 and is subject to frequent springtime flood events. Grassy Lake is the western boundary of both proposed parcels. A portion of the northwest corner of EOI #2254 is a wetland area, part of the northern end of Grassy Lake. For EOI #2261, wetland riparian areas exist in the form of beaver ponds containing both open surface water as well as vegetated wetland on the southern portion of the parcel. Nearby area wetland riparian areas exist adjacent to 1,721 acre Kepler Creek Lake, ~ 2 miles west, fed by Kepler Creek flowing in from the northeast. Once leaving the spillway on the southwestern end of the lake, Kepler Creek flows for four miles and joins Black Lake Bayou, one of Louisiana's Natural and Scenic Rivers. Lake Bistineau and the Red River are located ~18 miles and 26 miles west, respectively, of EOI #2261.

3.11 Invasive/Exotic Species

Noxious weeds can have a disastrous impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. Noxious weeds cause $2 to $3 million in estimated losses to producers annually. These losses are attributed to: 1) decreased quality of agricultural products due to high levels of competition from noxious weeds, 2) decreased quantity of agricultural products due to noxious weed infestations, and 3) costs to control and/or prevent the spread of noxious weeds.

There are a number of non-native species that are considered invasive in Louisiana. Louisiana State University (LSU) Agriculture Center has published a list of invasive species documented in Louisiana, summarized in the table below. The potential applicability of these invasive species' habitat to the proposed tract is also discussed below. On the January 25, 2017 reconnaissance site visit to EOI #2254 and 2255, three invasive species on this list were observed – Johnson grass, Brazilian vervain, and water hyacinth. Johnson grass is one of the most noxious weeds, world-wide. It is a Mediterranean invasive difficult to eradicate in agriculture fields where frequent disturbance occurs. Brazilian vervain is a naturalized invasive common to forest edges and openings in the southeast. Water hyacinth is a widespread, floating South American invasive plant that forms dense mats, shading out many native aquatic plant species. No invasive species were observed during the reconnaissance site visit to EOI #2261. While none of the following invasive species were observed while on this tract, the table below notes if the tracts contain optimal or potential habitat for these invasive species.

Table 3-4. List of invasive species documented to occur in Louisiana by the Louisiana State University (LSU) Ag Center.

COMMON NAME	SCIENTIFIC NAME	HABITAT SUITABILITY ON PARCELS
Alligator weed	*Alternanthera philoxeroides*	Potential
Japanese climbing fern	*Lygodium japonicum*	Potential
Chinaberry	*Melia azedarach*	Potential
Johnson grass	*Sorghum halepense*	Optimal
Chinese privet	*Ligustrum sinense*	Optimal
Japanese honeysuckle	*Lonicera japonica*	Optimal
Brazilian vervain	*Verbena brasiliensis*	Optimal
Cogon grass	*Imperata cylindrica*	Potential
Chinese tallow tree	*Triadica sebifera*	Potential
Common salvinia	*Salvinia minima*	Optimal
Hydrilla	*Hydrilla verticillata*	Optimal
Mimosa	*Albizia julibrissin*	Potential
Water hyacinth	*Eichhorinia crassipes*	Optimal

Source: USDA 2007.

3.12 Vegetation and Wildlife

3.12.1 Vegetation

EOI #2254 and 2255

EOI #2254 and 2255 are located in Catahoula Parish, Louisiana in the Mississippi Alluvial Plain ecoregion. According to the USGS (Daigle, J.J., et al. 2006), this ecoregion consists of nearly level, poorly-drained floodplains and undulating terraces. Wetlands, ponds, abandoned channels, oxbow lakes, and low ridges occur. Potential natural vegetation is mapped as southern floodplain forest. Some woodlands remain but agricultural land use for livestock and crops is extensive (Daigle, J.J., et al. USGS. 2006).

The majority of the acres comprising EOI #2254 and 2255 are open agricultural fields. A reconnaissance site visit to EOI #2254 on January 25, 2017 revealed dominant tree species occurring in the fringe woodlands and wetlands around the parcel were: bald cypress (*Taxodium distichum*), sugarberry (*Celtis laevigata*), overcup oak (*Quercus lyrata*), nuttall oak (*Q. texana*), sweetgum (*Liquidambar styraciflua*), bitter pecan (*Carya aquatica*), honey locust (*Gleditsia triacanthos*) and green ash (*Fraxinus pennsylvanica*). Observed understory and midstory species include swamp privet (*Forestiera acuminata*), American elm (*Ulmus americana*), saw palmetto (*Serenoa repens*), dewberry (*Rubus caesius*), poison ivy (*Toxicodendron radicans*), muscadine (*Vitis rotundifolia*) and peppervine (*Ampolepsis arborea*). Both EOI #2254 (partially) and 2255 (entirely) were part of a harvested agricultural field from 2016 that contained observed plant species such as winter wheat (*Triticum aestivum*), hemp sesbania (*Sesbania herbacea*), Carolina geranium (*Geranium carolinianum*), and Brazilian vervain (*Verbena brasiliensis*). The surrounding area within a two-mile buffer exhibits typical land use patterns in the Mississippi alluvial floodplain. This use pattern contains mainly cleared fields for intensive agriculture use, bordered by small forested wetland areas too wet to farm (Figure 3-3).

EOI #2261

EOI #2261 is located in Bienville Parish, Louisiana in the South Central Plain ecoregion. According to the USGS (2006), this ecoregion consists of extensively dissected, hilly uplands. Natural vegetation includes a diversity of natural communities such as longleaf pine forests and savannas, hardwood slope forests including beech and magnolia; calcareous forests and prairies, pitcher plant and orchid bogs, and mixed pine and oak forests. Some pasture and hayland is present but primary vegetation consists of woodlands; forested wetlands and pine plantations (Daigle, J.J., et al. USGS. 2006).

Based on field reconnaissance during the site visit conducted on January 17, 2017, the parcel is approximately 50% forested in loblolly pine (*Pinus taeda)* plantation and 50% open wetland and Streamside Management Zone (SMZ) hardwood buffer forest. Dominant vegetation consists of loblolly pine in the north and central parts of the parcel. Dominant overstory is discontinuous and consisted of various oak (*Quercus*) species including: post (*Q. stellata*) white (*Q. alba*), swamp chestnut (*Q. michauxii*), and willow (*Q. phellos*), southern magnolia (*Magnolia* grandiflora), swamp tupelo (*Nyssa sylvatica var biflora*), loblolly pine, and slash pine (*P. elliottii*). Mid and understory vegetation consists of American beech (*Fagus grandifolia*), yaupon (*Ilex vomitoria*), eastern hophornbeam (*Ostrya virginiana*), American holly (*Ilex opaca*), muscadine (*Vitis rotundifolia*), tree sparkleberry (*Vaccinium arboretum*), greenbrier species (*Smilax rotundifolia and bona-nox*), devil's walking stick (*Aralia spinosa*), and Eastern baccharis (*Baccharis halimifolia*). The southern half of the parcel is fringe of mixed pine-hardwood fingers surrounding a chain of beaver-pond wetland complexes. The surrounding area within a two-mile buffer contains forested woodlands, primarily commercially-planted pine plantations (Figure 3-4).

3.12.2 Wildlife

Wildlife species diversity and abundance on EOI #2254 and 2255 are likely low due to the lack of wildlife habitat diversity and abundance present in cleared agricultural fields with bordering bottomland hardwood trees. Species likely present include birds of prey, mourning dove

(*Zenaida macroura*), passerines, wading birds, waterfowl during seasonal migration, passing Louisiana black bear (*Ursus americanus luteolus*), rodents such as fox squirrel (*Sciurus niger*), eastern wood rat (*Neotoma floridana*), and cotton rats (*Sigmodon hispidus*), and perhaps nuisance wildlife such as armadillo (*Dasypus novemcinctus*) and wild pigs (*Sus scrofa*). White-tailed deer (*Odocoileus virginianus*) and Great egret (*Ardea alba*) were observed during the January 25, 2017 site reconnaissance visit.

Wildlife diversity and abundance is likely moderate to high on EOI #2261 due to the presence of two primary habitat types: pine forest and open wetland with fringe hardwood forest present. Waterfowl species observed were American widgeon (*Anas americana*), mallards (*Anas platyrhynchos*), gadwall (*Anas strepera*), and wood duck (*Aix sponsa*). Active beaver (*Castor canadensis*) lodges were observed as well as abundant tracks and signs of raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), and wild turkey (*Meleagris gallipavo*). Surrounding areas contain a largely planted pine forest and some mixture of hardwood forested areas. In general, the species inhabiting the parcel and surrounding area are likely to be typical of those found in northwest Louisiana. Most species may occur commonly in one particular habitat but are also likely to frequent adjacent habitats.

Hunting is a popular pastime in Louisiana and game species populations are high enough to support this activity. Major game on non-developed areas of northwest Louisiana includes white-tailed deer, wild turkey, fox, gray squirrel, bobwhite quail, woodcock, waterfowl, and mourning dove. Public hunting is available on nearby Loggy Bayou WMA with restrictions enforced by the Louisiana Department of Wildlife and Fisheries (LDWF).

3.13 Special Status Species

3.13.1 State Listed Species

Tables 3-5 and 3-6 lists rare species documented to occur in Catahoula Parish (EOI #2254 and 2255) (Table 3-5) and Bienville Parish (EOI #2261) (Table 3-6) by the Louisiana Natural Heritage Program (LNHP) that have been given a State Rank of S1 (critically imperiled), S2 (imperiled) or S3 (rare) including the availability of suitable habitat on the parcel.

Table 3-5. List of rare species documented to occur in Catahoula Parish by the LNHP and the availability of suitable habitat on the proposed tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Short-eared Owl	*Asio flammeus*	S3N	G5	Yes
Ringtail	*Bassariscus astutus*	S1	G5	No
Central Stoneroller	*Campostoma anomalum*	S2	G5	No
Worm-eating Warbler	*Helmitheros vermivorus*	S3B	G5	Yes
Alligator Snapping Turtle	*Macrochelys temminckii*	S3	G3G4	Yes
Red-cockaded Woodpecker	*Picoides borealis*	S2	G3	No
Louisiana Slimy salamander	*Plethodon kisatchie*	S1	G3G4Q	Yes
Southern Red-backed	*Plethodon serratus*	S1	G5	Yes

Salamander				
Paddlefish	*Polyodon spathula*	S4	G4	No
Louisiana Waterthrush	*Seirus motacilla*	S3S4B	G5	Yes

None of the species listed above were observed during the site visit conducted on January 25, 2017.

Table 3-6. List of rare species documented to occur in Bienville Parish by the LNHP and the availability of suitable habitat on the proposed tract.

Common Name	**Scientific Name**	**State Rank**	**Global Rank**	**Suitable Habitat on Parcel**
Northern Long-eared Bat	*Myotis septentrionalis*	S1	G4	Yes
Bachman's Sparrow	*Aimophila aestivalis*	S3	G3	No
Yellow Brachycercus Mayfly	*Brachycercus flavus*	S2	G4	No
Alligator Snapping Turtle	*Microchelys temminckii*	S3	G3G4	Yes
Red-cockaded Woodpecker	*Picoides borealis*	S2	G3	Yes
Louisiana Pine Snake	*Pituophis ruthveni*	S2	G2Q	Yes
Comanche Harvester Ant	*Pogonomyrm ex comanche*	S2	GNR	Yes
Louisiana Water thrush	*Seirus motocilla*	S3S4B	G5	Yes

Large red ants, similar in appearance to the Comanche harvester ant, were observed during the site visit conducted on January 18, 2017 approximately one mile south of EOI #2261. It is possible that this was the Comanche harvester ant. None of the other species listed above were observed during the site visit.

3.13.2 Federally Listed Species

Section 7 of the ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are "likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species." Table 3.7 and 3.8 present species listed by USFWS as endangered, threatened, proposed, or candidate that are documented to occur in Catahoula and Bienville Parishes, Louisiana. The table also notes the presence of suitable habitat on the parcel. Specific information regarding habitat requirements is provided below under each species section. Details regarding species habitat, habits, threats and other information has been obtained from the Nature Serve website (www.natureserve.org) and published literature.

3.13.2.1 EOI #2254 and 2255

Table 3-7. List of threatened and endangered species documented to occur in Catahoula Parish by USFWS.

Species	**Federal Status**	**Suitable Habitat on Parcel**
Northern long-eared Bat (*Myotis septentrionalis*)	Threatened	Suitable habitat present
Red-cockaded Woodpecker (*Picoides borealis*)	Endangered	Potential habitat present

Pallid Sturgeon (*Scaphirhynchos albus*)	Candidate	No suitable habitat present
Louisiana Black Bear (*Ursus americanus luteolus*)	Recovered	Suitable habitat present

3.13.2.1.1 Northern Long-eared Bat (*Myotis septentrionalis*) (Threatened)

The northern long-eared bat requires caves or mines to hibernate in during the winter. During the summer months, this species can be found roosting in caves, mines, or buildings, and under loose bark, bridges, or in hollow tree cavities. Research has shown that during the summer months, presence and activity of the northern long-eared bat is highest in forests with late successional characteristics. Late-successional forest characteristics that seem to be important to this species includes a high percentage of old trees (>100 years), uneven forest structure, single and multiple tree fall gaps, standing snags, and woody debris. These characteristics provide a high number of dead or decaying trees that can be used for breeding, summer day roosting, and foraging.

M. septentrionalis was first documented in Louisiana in 2000 when three individuals were captured on the Winn District of Kisatchie National Forest (KNF) in Winn Parish during mist net surveys conducted by Crnkovic (2003). Fourteen additional individuals were captured during mist net and bridge surveys on the Winn and Catahoula Districts of Kisatchie NF in Winn and Grant Parishes from 2002 – 2004 (Leberg 2004, Ferrara and Leberg 2005) and 2008 - 2009 (Nixon and Leberg 2009). All occurrence records for this species in Louisiana were documented during mist net and bridge surveys conducted on Kisatchie NF in two Parishes.

EOI #2254 and 2255 are approximately ten miles north/northwest of the Winn District and twenty-five miles north/northwest of the Catahoula District. Suitable summer roosting and year-round foraging habitat is available for the northern long-eared bat on these EOIs.

3.13.2.1.2 Red-cockaded Woodpecker (*Picoides borealis*) (Endangered)

The red-cockaded woodpecker is both federally and state-listed as endangered. Appropriate habitat for the woodpecker includes mature pine forests and mixed pine-upland hardwood forest with little or no hardwood mid-story. The average cavity tree age ranges from 60 to 126 years for longleaf pine, 70 to 90 years for loblolly pine, and 75 to 149 years for shortleaf pine. RCWs forage in habitat consisting of pine stands with an average Diameter at Breast Height (DBH) of 9 inches or greater, and in pole stands with 4 to 9 inches DBH. EOI #2254 and 2255 do not meet any of the habitat requirements for RCW potential.

3.13.2.1.3 Pallid Sturgeon (*Scaphirhynchus albus*) (Endangered)

The pallid sturgeon is known to occur in the Atchafalaya River in central Louisiana. The Atchafalaya River contains approximately 224 free-flowing river-kilometers. The population in this river may be a few thousand. River channelization and the construction and operation of large dams have eliminated and degraded preferred sturgeon habitat. Habitat changes have

severely reduced or eliminated successful reproduction. This species occupies large, turbid, free-flowing riverine habitat. It occurs in strong current over firm gravel or sandy substrate. There are no rivers on EOI #2254 and 2255.

3.13.2.1.4 Louisiana Black Bear (*Ursus americanus luteolus*) (Recovered)

The Louisiana black bear (*Ursus americanus luteolus*) was removed from the List of Threatened and Endangered Wildlife and considered recovered on March 10, 2016. This species typically inhabits bottomland hardwood (BLH) communities but other habitat types, including agricultural fields, may be utilized. Remoteness is an important spatial feature of black bear habitat. In the Southeast, remoteness is relative to forest tract size and the presence of roads. High quality cover for bedding, denning, and escape cover is of great importance as forests become smaller, more fragmented, and as human encroachment and disturbance in bear habitat increases. Variance in annual food abundance seems to be the most critical natural factor affecting Louisiana black bear populations.

Although ESA consultation is no longer required regarding project impacts on this subspecies, in the interest of conserving the Louisiana black bear, projects proposed in areas of the state that are inhabited by bears should be designed to avoid adversely affecting this subspecies or its habitat. Conservation measures for the Louisiana black bear include reducing the footprint of proposed actions to the maximum extent feasible, avoiding impacts to trees that are 36 inches or more in diameter at breast height, and avoiding vegetative clearing during the black bear denning season (i.e., December 1 through April 30).

EOI #2254 and 2255 consist of 10.25 acres of agricultural fields and fringe bottomland hardwoods along large drainages or river systems in the Mississippi River floodplain. Both could provide food (if planted to either corn or soybeans) and at least one tree meeting the size requirements for denning was documented on EOI #2254 during the January 25, 2017 site reconnaissance visit.

3.13.2.2 EOI #2261

Table 3-8. List of threatened and endangered species documented to occur in Bienville Parish by USFWS.

Species	Federal Status	Suitable Habitat on Parcel
Northern long-eared Bat (*Myotis septentrionalis*)	Threatened	Suitable habitat present
Red-cockaded Woodpecker (*Picoides borealis*)	Endangered	Potential habitat present
Louisiana Pine Snake (*Pituophis ruthveni*)	Candidate	Suitable habitat present
Texas Emerald (*Somatochlora margarita*)	Under Review	No suitable habitat present
Louisiana Black Bear (*Ursus americanus luteolus*)	Recovered	Suitable habitat present

3.13.2.2.1 Northern Long-eared Bat (*Myotis septentrionalis*) (Threatened with a 4(d))

Preferred habitat characteristics and occurrence in Louisiana for the northern long-eared bat are

described above. EOI #2261 is approximately fifty-five miles east of the Catahoula District and seventy miles east of the Winn District. Suitable summer roosting and year-round foraging habitat is available on EOI #2261 for the northern long-eared bat.

3.13.2.2.2 Red-cockaded Woodpecker (*Picoides borealis*) (Endangered)

Preferred habitat characteristics for the red-cockaded woodpecker are described above. EOI #2261 contains a significant pine component; however, preferred suitable habitat to support woodpecker colonies is not available at the proposed project sites due to high pine basal area, a lack of suitable mid-story foraging area, and a lack of suitable pine tree age-class for nest cavity occurrence. There is a small potential that RCWs could occur on EOI #2261, although it is unlikely due to the reasons noted above.

3.13.2.2.3 Louisiana Pine Snake (*Pituophis ruthveni*) (Candidate)

A large (4-5 feet), non-venomous constrictor of the Colubridae family, the Louisiana pine snake (LPS) (*Pituophis ruthveni*) is one of the rarest snakes in North America and one of the rarest vertebrate species in the U.S. It is classified as imperiled-to-vulnerable in Louisiana. It is generally associated with sandy, well-drained soils and open canopy pine forests, especially longleaf-pine savannah having a moderate to sparse mid-story and a well-developed herbaceous understory dominated by grasses. Its activity appears to be heavily concentrated on low, broad ridges overlain with sandy soils and is closely associated with Baird's pocket gophers (*Geomys breviceps*) which serve as a major source of food and create the burrow systems in which the pine snakes spend much of their time. Pocket gopher occurrence is dependent on an abundance of herbaceous groundcover and loose, sandy soils. Herbaceous groundcover is directly correlated with an open canopy.

As a candidate species, the LPS is being considered for listing under the ESA, but currently receives no federal protection. The LPS has experienced population declines due to the loss and fragmentation of native longleaf and shortleaf pine forests in recent decades. The LPS's remarkably low fecundity magnifies threats from urban development, conversion to agriculture, road construction, and mining, making it particularly vulnerable to local extirpations. Presently this species is found in four of the nine Louisiana Parishes in which it originally existed. Suitable habitat exists on EOI #2261.

3.13.2.2.4 Texas Emerald (*Somatochlora margarita*) (Under Review)

Very little is known about this member of the Corduliidae family and is considered one of the rarest dragonflies in the country. It is currently awaiting federal listing under the ESA of 1973 after a September 2011 petition to the USFWS. The Texas emerald dragonfly has been documented in nine counties in Texas and three parishes in Louisiana (Bienville, Natchitoches, and Rapides) according to the Texas Nongame and Rare Species program at Texas Parks and Wildlife Department (Hutchins 2016). Survey sampling methodology has had significant difficulty documenting and estimating populations of this species. One difficulty is that adults spend much of their time at the canopy level. Recent research from the University of Alabama has indicated an association of the Texas emerald larval stage with pitcher-plant bog habitats (Hutchins 2016).

Pitcher-plant bogs have long been the target of habitat protection and restoration efforts. They often serve as hosts of other sensitive plant and animal species. Management practices that maintain healthy pitcher-plant bog plant communities include physical protection, prescribed fire to reduce hardwood competition, nuisance plant and animal control for detrimental species such as cogon grass and feral pigs, and implementing Best Management Practices (BMPs) during timber harvest and regeneration operations. These pitcher-plant bog management practices are presumed to help provide potential habitat for the Texas emerald in Texas and Louisiana. As a species under review, the Texas emerald is being considered for listing under the ESA, but currently receives no federal protection. There is no suitable habitat for the Texas emerald on EOI #2261.

3.13.2.2.5 Louisiana Black Bear (*Ursus americanus luteolus*) (Recovery)

Preferred habitat characteristics for this species are described above. EOI #2261 offers 39.9 acres of potential bedding, denning and escape cover in a remote area containing bottomland hardwoods within the known range of Louisiana black bear. The surrounding habitat is heavily wooded. There is suitable habitat available for the Louisiana black bear on the proposed parcel sites.

3.14 Migratory Bird Species of Concern

EO 13188, 66 *Federal Register* 3853, (January 17, 2001) identifies the responsibility of federal agencies to protect migratory birds and their habitats, and directs executive departments and agencies to undertake actions that will further implement the Migratory Bird Treaty Act (MBTA). Under the MBTA, incidental, unintentional, and accidental take, killing, or possession of a migratory bird or its parts, nests, eggs or products, manufactured or not, without a permit is unlawful. EO 13186 includes a directive for federal agencies to develop a Memorandum of Understanding with the USFWS to promote the conservation of migratory bird populations, including their habitats, when their actions have, or are likely to have, a measureable negative effect on migratory bird populations.

For the purpose of this analysis, the term "migratory birds" applies generally to native bird species protected by the MBTA. This includes native passerines (flycatchers and songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Among the wide variety of species protected by the MBTA, special concern is usually given to the following groups:

- Species that migrate across long distances, particularly Neotropical migrant passerines that winter in tropical or Southern Hemisphere temperate zones
- Birds of prey, which require large areas of suitable habitat for finding sufficient prey
- Species that have narrow habitat tolerances and hence are vulnerable to extirpation from an area as a result of a relatively minor habitat loss
- Species that nest colonially and hence are vulnerable to extirpation from an area as a result of minor habitat loss

Because of the many species that fall within one or more of these groups, BLM focuses on species identified by USFWS as Birds of Conservation Concern (BCC) (USDI USFWS 2008). Table 3-9 lists the BCC found in the Mississippi Alluvial Valley Region where EOI #2254 and 2255 are located. Table 3-10 lists the BCC found in the West Gulf Coastal Plain where EOI #2261 is located. There is suitable habitat on the proposed lease parcel and surrounding area for several BCC on these lists.

Table 3-9. List of BCC found in the Mississippi Alluvial Valley Region (EOI #2254 and 2255).

Common Name	Scientific Name	Suitable Habitat Located on Parcel
American Bittern (nb)	*Botaurus lentiginosus*	Yes
Least Bittern	*Ixobrychus exilis*	Yes
Swallow-tailed Kite	*Elanoides forficatus*	Yes
Bald Eagle (b)	*Haliaeetus leucocephalus*	Yes
Peregrine Falcon (b)	*Falco peregrinus*	No
Yellow Rail (nb)	*Coturnicops noveboracensis*	No
Black Rail	*Laterallus jamaicensis*	No
Solitary Sandpiper (nb)	*Tringa solitaria*	No
Hudsonian Godwit (nb)	*Limosa haemastica*	No
Marbled Godwit (nb)	*Limosa fedoa*	No
Buff-breasted Sandpiper (nb)	*Tryngites subruficollis*	No
Short-billed Dowitcher (nb)	*Limnodromus griseus*	No
Short-eared Owl (nb)	*Asio flammeus*	Yes
Red-headed Woodpecker	*Melanerpes erythrocephalus*	No
Sedge Wren	*Cistothorus platensis*	No
Wood Thrush	*Hylocichla mustelina*	Yes
Cerulean Warbler	*Dendroica cerulea*	Yes
Prothonotary Warbler	*Protonotaria citrea*	Yes
Swainson's Warbler	*Limnothlypis swainsonii*	Yes
Kentucky Warbler	*Oporornis formosus*	Yes
Henslow's Sparrow (nb)	*Ammodramus henslowii*	No
LeConte's Sparrow (nb)	*Ammodramus leconteii*	No
Painted Bunting	*Passerina ciris*	Yes
Dickcissel	*Spiza americana*	No
Rusty Blackbird (nb)	*Euphagus carolinus*	Yes
Orchard Oriole	*Icterus spurius*	Yes

Note: (a) - ESA candidate, (b) - ESA delisted, (c) - non-listed subspecies or population of threatened or endangered species, (nb) - non-breeding in this Bird Conservation Region. Source: U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/]

Table 3-10. List of BCC found in the West Gulf Coastal Plain Region (EOI #2261).

Common Name	Scientific Name	Suitable Habitat Located on Parcel
Least Bittern	*Ixobrychus exilis*	Yes
Little Blue Heron	*Egretta caerulea*	Yes
Swallow-tailed Kite	*Elanoides forficatus*	Yes
Bald Eagle (b)	*Haliaeetus leucocephalus*	Yes

Common Name	Scientific Name	Suitable Habitat Located on Parcel
American Kestrel	*Falco sparverius*	Yes
Yellow Rail (nb)	*Coturnicops noveboracensis*	No
Solitary Sandpiper (nb)	*Tringa solitaria*	No
Hudsonian Godwit (nb)	*Limosa haemastica*	No
Buff-breasted Sandpiper (nb)	*Tryngites subruficollis*	No
Chuck-will's widow	*Caprimulgus carolinensis*	Yes
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Yes
Loggerhead Shrike	*Lanius ludovicianus*	Yes
Short-eared Owl (nb)	*Asio flammeus*	Yes
Brown-headed Nuthatch	*Sitta pusilla*	Yes
Bewick's Wren (bewickii ssp.)	*Thryomanes bewickii*	Yes
Wood Thrush	*Hylocichla mustelina*	Yes
Sprague's Pipit (nb)	*Anthus spragueii*	No
Prairie Warbler	*Dendroica discolor*	Yes
Cerulean Warbler	*Dendroica cerulea*	Yes
Prothonotary Warbler	*Protonotaria citrea*	Yes
Worm-eating Warbler	*Helmitheros vermivorum*	Yes
Swainson's Warbler	*Limnothlypis swainsonii*	Yes
Louisiana Waterthrush	*Parkesia motacilla*	Yes
Kentucky Warbler	*Oporornis formosus*	Yes
Bachman's Sparrow	*Peucaea aestivalis*	No
Henslow's Sparrow (nb)	*Ammodramus henslowii*	No
Smith's Longspur	*Limnothlypis swainsonii*	No
Painted Bunting	*Passerina ciris*	Yes
Orchard Oriole	*Icterus spurius*	Yes

Note: (a) - ESA candidate, (b) - ESA delisted, (c) - non-listed subspecies or population of threatened or endangered species, (nb) - non-breeding in this Bird Conservation Region. Source: U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/]

3.15 Public Health and Safety

NEPA requires federal agencies to evaluate whether a Proposed Action is significant based on the "degree to which the proposed action affects public health or safety" (40 CFR 1508.27). Public health and safety is often considered within the context of other resources, such as air quality, water quality and/or quantity, environmental justice, or transportation, among others, and is typically assessed in terms of what the expected risk is to the human environment as a result of the Proposed Action. For this EA, public health and safety issues are generally considered within the boundary of the proposed lease parcel; although some issues related to public health and safety, such as air quality, requires consideration of a larger affected environment due to the potential dispersion of air emissions.

A fundamental agency value of BLM is to operate in a safe manner and to provide a safe environment for the public. This safety outlook applies to all types of projects proposed by BLM and on BLM-administered lands, including mineral development. The BLM has the

responsibility along with state and local authorities to implement the appropriate measures, when needed to provide for public safety.

Onshore Oil and Gas Orders are a way in which BLM implements and supplements the oil and gas regulations found at 43 CFR 3160 for conducting oil and gas operations, particularly at the APD stage. These Onshore Orders are listed below:

- **Order No. 1** - Approval of Operations: This Order provides procedures for submitting an Application for Permit to Drill and all required approvals of subsequent well operations and other lease operations;
- **Order No. 2 –** Drilling: This Order provides requirements and standards for drilling and abandonment;
- **Order No. 3** - Site Security: This Order provides requirements and standards for site security;
- **Order No. 4** - Measurement of Oil: This Order provides requirements and standards for measurement of oil;
- **Order No. 5** - Measurement of Gas: This Order provides the requirements and standards for the measurement of gas;
- **Order No. 6** - Hydrogen Sulfide Operations: This Order provides the requirements and standards for conducting oil and gas operations in an environment known to or expected to contain hydrogen sulfide (H2S) gas; and
- **Order No. 7** - Disposal of Produced Waters: This Order provides the methods and approvals necessary to dispose of produced water associated with oil and gas operations.

3.16 Transportation

Existing roadways on the proposed lease parcels (EOI #2254, 2255, and 2261) are unimproved dirt and/or gravel logging roads, farming turn-rows and timber management fire-lines for agriculture and forestry management. EOI #2254 and 2255 in Catahoula Parish are located in a large agricultural field (cotton production in 2016); however, no existing dirt turn-row or roadway would be impacted or constructed since no well pad would be placed directly on the lease parcel – i.e. no surface disturbance. Any surface disturbance on these parcels would occur within the section on a previously existing well pad as assigned by the State of Louisiana. There is an existing well pad nearby that, if used, could increase heavy truck traffic and potentially impact a graveled road, Levee Street, that lies on top of the actual levee between the agriculture field and the Black River.

EOI #2261 in Bienville Parish is located in a remote location surrounded by commercial pine plantation. There are only narrow, unimproved dirt roads; actually firelines or ATV trails on the lease parcel. Any increase in vehicle traffic resulting from future mineral development could potentially cause both ground and wildlife disturbance as well as an increase in noise, dust, and soil compaction.

4.0 CHAPTER 4 - ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This chapter assesses the anticipated environmental consequences associated with direct, indirect, and cumulative effects of the Proposed Action and No Action Alternative. In accordance with DOI and BLM NEPA procedures, the level of detail, scope, and complexity of analyses should be commensurate with the scale, impacts, scientific complexities, uncertainties, and other aspects (such as public concern), inherent in potential decisions. Therefore, the level of analysis presented in this EA for each resource is based on factors such as the size of the project and anticipated level of effect.

4.1 Land Use

4.1.1 Proposed Action

There would be no direct impacts to land use as a result of leasing as there would be no surface disturbing activities at this stage. The RFD scenario developed for this EA predicts that in the future approximately 14.97 acres of surface disturbance would occur within the sections containing the proposed parcels. No surface disturbance would occur on the parcels themselves. There would likely be short and long term changes to land use as a result of reasonably foreseeable oil and gas development on these lands. Reclamation activities at the site would result in some of the land being reverted to natural conditions over time.

4.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.2 Visual/Noise/Recreation Resources

4.2.1 Proposed Action

Under the Proposed Action, the RFD scenario projects 14.97 acres of surface disturbance within the section containing EOI #2254, 2255, and 2261 as a result of reasonably foreseeable oil and gas development. There will be no surface disturbance on the parcels. Visual impacts due to potential development within these sections may be short or long term, depending on when oil and gas activities commence and are completed. While the act of leasing federal minerals would produce no impacts to visual resources since there is no surface disturbing activities at this time, subsequent exploration/development could affect visual quality on adjacent lands through: increased visibility of constructed features such as roads, well pads, pipelines, and tank batteries; road degeneration from heavy trucks and vehicles following rain; dust and exhaust from construction, drilling, and production vehicles and equipment; vegetation removal; unreclaimed sites; and discarded equipment. Well pads, power lines, access roads, and associated production facilities and storage tanks have the greatest potential to alter visual conditions for the life of the well. Vegetation removal would present an obvious contrast in color with the surrounding

vegetation and affect foreground and middleground distance zones for more than a decade. These impacts would be most obvious immediately after construction. Impacts would decrease as the disturbed surface began to blend in color, form, and texture, when interim or final reclamation occurs. Long-term visual impacts could persist as long as the well is producing, which could be a couple of years to more than 50 years. Long-term impacts may include vegetation removal, alteration of the landscape, and installation of equipment and facilities. Reclamation activities would result in some of the land being reverted to natural conditions over time.

Noise generation from well operations would be associated with vehicle movements and the operation of production equipment. There could be short term noise impacts associated with construction, drilling, and/or completion of reasonably foreseeable oil and gas development activities within the sections containing EOI #2254, 2255, and 2261, but the intensity of the impacts would likely be minimal. Noise generating activities would lessen over time as production commences, when the site would be visited periodically and/or to haul produced fluids. There is currently no development on the lease parcels and minimal development surrounding the parcels, so it is unlikely that any residences would be disturbed from noise associated with potential future oil and gas development from leasing EOI #2254, 2255, and 2261.

The proposed project sites are located on and surrounded by private property. The only recreational activity likely to occur on and surrounding the project area is hunting by local land owners. Hunting is regulated by the LDWF. Hunting activities occur only at certain times of the year for each game species by state law. Hunting prohibitions for the potential future development would be a short-term, direct impact while drilling but long-term impacts are not expected.

4.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.3 Socioeconomics and Environmental Justice

4.3.1 Proposed Action

4.3.1.1 Socioeconomics

The direct effect of the Proposed Action would be the payments received, if any, from the leasing of 50.15 acres of federal mineral estate. If the leases are sold and it leads to actual well drilling and economic production in the future, it would likely bring modest revenues in the form of royalty payments, severance taxes, and rent monies to the state and county. Economic production would provide wages and salaries to employees, maintenance staff, and contractors employed in drilling wells, and sales to area hotels, restaurants, and other businesses that serve drillers for the duration of drilling and similar construction-related benefits later as wells are

abandoned and sites restored. Other effects could include the potential for increases in traffic congestion, noise and visual impacts associated with fluid mineral production.

It is speculative to predict the exact effects of this action since there is no guarantee that the lease will receive bids, and that the parcels will be developed and produce fluid minerals. Any APD received would require additional site-specific NEPA analysis which would further examine socioeconomic impacts to the local economy. It is unknown how oil and gas surface disturbances associated with exploration and development, such as construction of roads, well pads, and other infrastructure would affect the oil and gas sector or the associated services economy in Catahoula and Bienville Parishes. At this time it is not possible to determine the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in Catahoula and Bienville Parishes, but any effects would be anticipated to be beneficial.

4.3.1.2 Environmental Justice

No minority or low income populations would be disproportionately affected in the vicinity of the lease parcels from the proposed lease or subsequent development. The proposed leases would not create an unsafe or unhealthy environment for any population, including minority and low-income populations and therefore would not be out of conformance with EO 12898. The direct effect of the Proposed Action would be the payments received, if any, from the leasing of the 50.15 acres of federal mineral estate. Indirect positive environmental justice effects could include potential future employment opportunities related to oil and gas and service support industries that might result, should the leases be sold and whether exploration and development of the leases occurs. It is speculative to predict the exact effects of the leasing action to human health and the environment, as site-specific development proposals and analysis would be examined in future NEPA. The total surface disturbance estimated for this lease sale parcel based on the RFD scenario of three well pads is approximately 14.97 acres. Potential adverse human health or environmental effects related to oil and gas production are not quantifiable at this stage but are limited in extent as to not likely to disproportionately affect low-income or minority populations. Specific impacts to public health, such as the potential for contamination of surface waters and aquifers due to subsurface hydraulic fracturing operations are considered extremely unlikely based on the thousands of feet of rock separating target formations from underground reservoirs. Additional discussion of the effects of oil and gas operations to water quality can be found in Section 4.9. Potential impacts to water use on low income or minority populations would be analyzed in more detail at the APD stage.

4.3.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.4 Cultural Resources and Native American Concerns

4.4.1 Proposed Action

There would be no direct impacts to cultural resources or Native American interests as a result of leasing as there would be no surface disturbance at this stage. Although literature reviews indicate there are historic resources on or within a mile of all three EOIs, cultural resource surveys have not been conducted on EOI #2254, 2255, and 2261 and therefore there may be undiscovered cultural resources present on or around the parcels. Direct and indirect impacts from reasonably foreseeable future oil and gas development may occur to cultural resources or to a potentially sacred Native American religious site if there is ground disturbance. Direct impacts are those such as completely destroying a site by bulldozing the area and workers picking up artifacts. Indirect impacts are those such as erosion or compaction of the soil on the site. If sites are located and recorded before ground disturbance begins, these impacts can be avoided or mitigated (see below - 4.4.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures).

Consultation with the SHPO and coordination with the tribes occurred on January 6, 2017. A concurrence letter from SHPO was received on February 1, 2017 agreeing with BLM's SSDO for "Section 106 compliance" (Appendix B). Also, responses were received from four Tribes, Jena Band of Choctaw, Choctaw Nation, Thlopthlocco Tribal Town, and Alabama-Coushatta Tribe in Texas. Both the Jena Band Choctaw and Choctaw Nation agree that Section 106 compliance be performed and wish to be consulted before ground disturbance and in the event of inadvertent discovery of Native American artifacts and/or human remains. Thlopthlocco Tribal Town and Alabama Coushatta Tribe of Texas both responded on February 8th, that Bienville and Catahoula Parishes' are outside their areas of interest. Thlopthlocco Tribal Town had responded earlier on January 31, 2017 that they do not support the use of Fracking techniques as impacts were not fully understood. Further, the response stated that they believed fracking had a detrimental impact on the subsurface that could impact water tables and they strongly objected to the use of fracking on federal lands.

4.4.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. If the proposed leases are not made available and cultural resource surveys are not conducted, direct and indirect impacts may occur. Direct impacts are those such as completely destroying a site by "relic hunters" or by people picking up artifacts. Other direct impacts may be the mixing of layers in a site by plowing or the destruction of a site by land leveling. Indirect impacts are those such as after timber thinning or clear-cutting resulting in erosion of a site.

4.4.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of cultural resources. In order to protect cultural resources, a cultural resources survey is needed before ground disturbance begins. A report of the survey would be approved by the BLM and the SHPO before the APD is approved. If a known recorded site is located within the lease area, it would be avoided up to 200 meters in

order to protect these resources. If avoidance is not possible, then the appropriate mitigation measures would be identified in coordination with the SHPO. Additional consultation with the SHPO and the appropriate federally recognized Native Americans would occur before APD approval is given.

In order to protect any currently used religious sites, if present, consultation with the appropriate Native American tribe/group is also necessary at the APD stage. If currently unknown burial sites are discovered during development activities associated with this lease, these activities must cease immediately, Louisiana state law on unknown burials would be followed and, if necessary, consultation with the appropriate tribe/group of federally recognized Native Americans would take place. The Authorized Officer may require relocation or modification of the proposed development to minimize impacts to sites or burials.

A BLM stipulation regarding cultural resources and Native American religious concerns applies to the lease parcels (Appendix A). The stipulation states that the BLM would not approve any ground disturbing activities that may affect historic properties and/or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. If currently unknown burials are discovered during development activities associated with these leases, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate Tribe/group of federally recognized Native Americans would take place.

4.5 Minerals and Mineral Development

4.5.1 Proposed Action

There would be no direct impacts to minerals from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration and oil and gas development could impact the production horizons and reservoir pressures. If production wells are established, the resources allotted to the wells would eventually be depleted. There could also be impacts to other mineral resources as a result of exploration/development through the loss of available surface or subsurface area needed to develop or access the other mineral resource overlapping the subject lease parcels. The extent of the impacts to mineral resources, if any, would be further determined once site-specific development information is available at the APD stage.

4.5.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.6 Wastes

4.6.1 Proposed Action

There would be no direct impacts due to waste generation from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration/oil and gas development could result in the introduction of hazardous and non-hazardous substances to the area. Oil and gas development activities typically generate the following wastes: (1) discharge of drilling fluids and cuttings into the reserve pits, (2) wastes generated from used lubrication oils, hydraulic fluids, and other fluids used during production of oil and gas, some of which may be characteristic or listed hazardous waste, and (3) service company wastes from exploration and production activities as well as containment of some general trash. Certain wastes unique to the exploration, development, and production of crude oil and natural gas have been exempted from Federal Regulations as hazardous waste under Subtitle C of the RCRA of 1976. The exempt waste must be intrinsic to exploration, development or production activities and cannot be generated as part of a transportation or manufacturing operation. The drilling fluids, drill cuttings, and produced waters are classified as a RCRA exempt waste, and potential drilling that could occur would not introduce hazardous substances into the environment if they are managed and disposed of properly under federal, state, and local waste management regulations and guidelines. Properly used, stored, and disposed of hazardous and non-hazardous substances greatly decreases the potential for any impact on any environmental resources. One way operators and the BLM ensure hazardous and non-hazardous substances are properly managed is through the preparation of a Spill Prevention, Control, and Countermeasure (SPCC) plan.

In hydraulic fracturing, chemical substances other than water make up a small percentage of the fluid composition; however, the very large volumes used require correspondingly large volumes of a variety of compounds. These substances range from the relatively benign to the highly toxic at certain concentrations. In addition to these added chemicals, naturally occurring toxicants such as heavy metals, VOCs, and radioactive compounds are mobilized during extraction and return to the surface with the produced water. Of the millions of gallons of water used to hydraulically fracture a well one time, less than half of this treatment water is recovered as flowback or later production brine and in many cases recovery is < 30% (Engelder 2014). Although the risk is low, the potential exists for unplanned releases that could have effects on human health and environment. A number of chemical additives are used that could be hazardous, but are safe when properly handled according to requirements and long-standing industry practices. In addition, many of these additives are common chemicals which people regularly encounter in everyday life (GWPC 2009).

Surface spills of drilling mud and additives, hydraulic fracturing fluids and additives, flowback water, and other formation fluids can happen at a variety of points in the development and production phases. Spills that occur can span a range of different spill sizes and causes of failure at any point in the process. For example, small spills often happen as the result of poor pipe connections or leaks; large spills sometimes occur as the result of a major well blowout, but such blowouts rarely occur. Additionally, spills from some parts of the phases may be the result of human error (i.e. vehicle collisions, improper handling, improper equipment operation or installation, etc.), while others stem from equipment failure (i.e. broken pipes, torn pit liners, leading tanks, etc.) or acts of nature (Fletcher 2012). The most common cause of spills comes from equipment failure and corrosion (Wenzel 2012).

The cause of the spill, the spill size, the hazard rating of the spilled material, response time to clean up the spill and the effectiveness of the cleanup, all play a critical role in determining the overall impact on the environment. The volume of a spill can significantly vary with spill types. Pipe spills are not expected to release more than 1,000 gallons into the environment, retaining pit spills and truck spills are not expected to release more than 10,000 gallons of fluid, and blowouts are expected to cause the largest spills, with the potential to release tens of thousands of gallons into the environment. Small spills occur with greater frequency than large spills. Secondary containment or recovery for small spills would likely minimize, if not eliminate, any potential release into the environment. However, for spills on the order of several thousands of gallons of fluid, it is expected that less than half the fluid may be captured by secondary containment or recovery. The vast majority of operations do not incur reportable spills (5 gallons or more), indicating that the fluid management process can be, and usually is, managed safely and effectively (Fletcher 2012). There are several BLM standard conditions of approval (COAs) that apply at the APD stage which would reduce waste hazards (See Section 4.6.3 below).

4.6.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.6.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts from wastes. The following measures to reduce adverse impacts from wastes are common to most projects: all trash would be placed in a portable trash cage and hauled to an approved landfill, with no burial or burning of trash permitted, chemical toilets would be provided for human waste, fresh water zones encountered during drilling operations would be isolated by using casing and cementing procedures, a berm or dike would enclose all production facilities if a well is productive, and all waste from all waste streams on site would be removed to an approved disposal site. Future development activities would be regulated under the RCRA, Subtitle C regulations. Additionally, waste management requirements are included in the 12 point surface use plan and the 9 point drilling plan required for all APDs. Leaseholders proposing development would be required to have approved SPCCPs, if the applicable requirements of 40 CFR 112 are met, and comply with all requirements for reporting of undesirable events. Lease bonds would not be released until all facilities have been removed, wells are plugged, and satisfactory reclamation has occurred.

There are five standard BLM COAs that would apply at the APD stage regarding handling and disposing of wastes, should federal minerals be accessed. These COAs include: storing wastes properly to minimize the potential for spills, providing secondary containment for all stored containers, draining the reserve pit before closure and trucked to a disposal site, use of

preventative measures to avoid drainage of fluids, sediments, and other contaminants from the pad into water bodies, and keeping the project area clear of trash.

Further, if shallow groundwater is expected or encountered at the project specific site, open reserve pits would not be authorized and all waste products would be hauled from the site to state-approved disposal facilities.

4.7 Soils

4.7.1 Proposed Action

While the act of leasing federal minerals would not affect soils, subsequent exploration/development may produce short and long term impacts by physically disturbing the topsoil and exposing the substratum soil on subsequent project areas. Direct impacts from reasonably foreseeable oil and gas construction of well pads, access roads, and reserve pits include: removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of topsoil productivity and susceptibility to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust from vehicle traffic during all phases of development. Vehicle traffic would be limited to approved travel routes in which the surface has not been paved or dressed in a material to prevent soil movement. The extent of wind erosion related to vehicle traffic would depend on a number of factors including: length of well bore, whether hydraulic fracturing is used during completion, whether telemetry is used during production, and whether the well is gas, oil, condensate, or a combination thereof. These impacts could result in increased indirect impacts such as runoff, erosion and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation on well sites, access roads, gas pipelines and facilities.

Additional soil impacts associated with future development can occur when heavy precipitation causes water erosion damage. When water saturated segment(s) on the access road become impassable, vehicles may still be driven over the road. Consequently, deep tire ruts may develop. Where impassable segments are created from deep rutting, unauthorized driving may occur outside the designated route of access roads.

Contamination of soil from future drilling, hydraulic fracturing, and production wastes mixed into soil or spilled on the soil surface could cause a long-term reduction in site productivity. Contaminants spilled on soil would have the potential to pollute and/or change the soil chemistry (see also Section 4.6, Wastes). These impacts can be reduced or avoided through proper design, construction, maintenance and implementation of BMPs and COAs, as described below in Section 4.7.3.

4.7.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.7.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts to soils. The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. During the life of the development, all disturbed areas not needed for active support of production operations should undergo "interim" reclamation in order to minimize the environmental impacts of development on other resources and used. Upon abandonment of wells and/or when access roads are no longer in service, final reclamation would be implemented.

The impact to the soil would be remedied upon reclamation of well pads when the stockpiled soil that was specifically conserved to establish a seed bed is spread over well pads and vegetation re-establishes. A permanent vegetation cover would be established on all disturbed areas. Road construction requirements and regular maintenance would alleviate potential impacts to access roads from water erosion damage.

Fluid impermeable containment systems (i.e. liners, dikes, berms) would be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to completely prevent solid contamination (e.g. liners) at the site or prevent the spill from going beyond the immediate site (e.g. dikes, berms).

A standard BLM COA would apply at the APD stage, should federal minerals be accessed, which would require the operator to take necessary measures to ensure that the final graded slopes are stabilized to prevent the movement of soil from the pad area for the life of the project. Stabilization techniques could include: natural, organic matting, silt fences, and or additional mulching.

4.8 Air Resources

4.8.1 Air Quality

4.8.1.1 Proposed Action

The administrative act of offering the proposed lease parcels would have no direct impacts on air quality. Any potential effects to air quality would occur if and when the leases were developed. Any proposed development project would be subject to additional analysis of possible air effects before approval and the analysis may include air quality modeling. A Memorandum of Understanding between the Departments of the Interior and Agriculture and USEPA directs that air quality modeling be conducted for actions that meet certain emissions or geographic criteria:

- Creation of a substantial increase in emissions
- Material contribution to potential adverse cumulative air quality impacts

- Class I or sensitive Class II Areas
- Non-attainment or maintenance area
- Area expected to exceed NAAQS or PSD increment

The project area includes no Class I, sensitive Class II, or non-attainment areas. Due to the small number of wells projected to follow a lease on the lease tracts in relation to the current volume of hydrocarbon, development of the leases is not likely to exceed the emissions criteria, NAAQS or PSD increment.

The following source of emissions are anticipated during any oil and gas exploration or development: combustion engines (i.e. fossil fuel fired internal combustion engines used to supply electrical or hydraulic power for hydraulic fracturing to drive the pumps and rigs used to drill the well, drill out the hydraulic stage plugs and run the production tubing in the well; generators to power drill rigs, pumps, and other equipment; compressors used to increase the pressure of the oil or gas for transport and use; and tailpipe emissions from vehicles transporting equipment to the site), venting (i.e. fuel storage tanks vents and pressure control equipment), mobile emissions (i.e. vehicles bringing equipment, personnel, or supplies to the location) and fugitive sources (i.e. pneumatic valves, tank leaks, and dust). A number of pollutants associated with combustion of fossil fuels are anticipated to be released during drilling including: CO, NOx, SO_2, Pb, PM, CO_2, CH_4, and N_2O. Venting may release VOC/HAP, H_2S, and CH_4. Mobile source emissions are likely to include fugitive particulate matter from dust or inordinate idling.

The actual emissions of each pollutant is entirely dependent on the factors described in the previous paragraph. During the completion phase, the most significant emissions of criteria pollutants emitted by oil and gas operations in general are VOCs, particulate matter and NO_2. VOCs and NOx contribute to the formation of O_3. The USEPA's Natural Gas STAR Program is a voluntary program that identifies sources of fugitive CH_4 and seeks to minimize fugitive CH_4 through careful tuning of existing equipment and technology upgrades. Data provided by STAR show that some of the largest air emissions in the natural gas industry occur as natural gas wells that have been fractured and are being prepared for production. During well completion, flowback, fracturing fluids, water, and reservoir gas come to the surface at high velocity and volume. This mixture includes a high volume of VOCs and CH_4, along with air toxins such as benzene, ethylbenzene, and n-hexane. The typical flowback process lasts from 3 to 10 days. Pollution also is emitted from other processes and equipment during production and transportation of the oil and gas from the well to a processing facility.

To reasonably quantify emissions associated with well exploration and production activities, certain types of information are needed. Such information includes a combination of activity data such as:

- The number, type, and duration of equipment needed to construct/reclaim, drill and complete (e.g. belly scrapers, rig, completions, supply trucks, compressor, and production facilities)
- The technologies which may be employed by a given company for drilling any new wells to reduce emissions (e.g. urea towers on diesel powered drill rigs, green completions, and multi-stage flares)

- Area of disturbance for each type of activity (e.g. roads, pads, pipelines, electrical lines, and compressor station)
- Compression per well (sales and field booster), or average horsepower for each type of compressor
- The number and type of facilities utilized for production

Air pollution can affect public health in many ways. Numerous scientific studies have linked air pollution to a variety of health problems including: (1) aggravation of respiratory and cardiovascular disease, (2) decreased lung function, (3) increased frequency and severity of respiratory symptoms such as difficulty breathing and coughing, (4) increased susceptibility to respiratory infections, (5) effects on the nervous system, including the brain, such as IQ loss and impacts on learning, memory, and behavior, (6) cancer, and (7) premature death. Some sensitive individuals appear to be at greater risk for air pollution-related health effects, for example, those with pre-existing heart and lung diseases (e.g., heart failure/ischemic heart disease, asthma, emphysema, and chronic bronchitis), diabetics, older adults, and children.

Degradation of air quality may also contribute damage to ecosystem resources. For example, ozone can damage vegetation, adversely impacting the growth of plants and trees. These impacts can reduce the ability of plants to uptake CO_2 from the atmosphere and can then indirectly affect the larger ecosystems.

4.8.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.8.1.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM encourages industry to incorporate and implement BMPs, which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include:

- Flared hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion
- Watering dirt roads during periods of high use to reduce fugitive dust emissions
- Co-location wells and production facilities to reduce new surface disturbance
- Implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores
- Requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored
- Performing interim reclamation to reclaim areas of the pad not required for production facilities and to reduce the amount of dust from the pads

Additionally, the BLM encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions.

In October 2012, USEPA promulgated air quality regulations for completion of hydraulically fractured gas wells. These rules require air pollution mitigation measures that reduce the emissions of VOCs during gas well completions. Mitigation includes a process known as "Green Completion" in which natural gas brought up during flowback must be recaptured and rerouted into the gathering line. In addition, at the APD stage, the BLM would encourage operators to participate in the voluntary STAR program.

4.8.2 GHGs and Climate

4.8.2.1 Proposed Action

The administrative act of leasing the proposed federal minerals would not result in any direct GHG emissions; however, potential future development of the proposed leases may contribute to the installation and production of new wells, which may consequently lead to an increase in GHG emissions. Many aspects of oil and gas production emit GHGs. The primary aspects include the following:

- Fossil fuel combustion for construction and operation of oil and gas facilities which include vehicles driving to and from production sites, engines that drive drill rigs, etc. These produce CO_2 in quantities that vary depending on the age, types, and conditions of the equipment as well as the targeted formation, locations of wells with respect to processing facilities and pipelines, and other site-specific factors.

- Fugitive CH_4 is CH_4 that escapes from wells (both gas and oil), oil storage, and various types of processing equipment. This is a major source of global CH_4 emissions. These emissions have been estimated for various aspects of the energy sector, and starting in 2011, producers are required under 40 CFR 98, to estimate and report their CH_4 emissions to the USEPA.

- It is expected that drilling would produce marketable quantities of oil and/or gas. Most of these products would be used for energy, and the combustion of the oil and/or gas would release CO_2 into the atmosphere. Fossil fuel combustion is the largest source of global CO_2.

The assessment of GHG emissions, their relationship to global climatic patterns, and the resulting impacts is an ongoing scientific process. The inconsistency in results of scientific models designed to predict changes in climate on regional or local scales, limits the ability to assess the significance of any discrete amount of GHG emissions on global climate. When further information is available, such information would be incorporated in the BLM's planning and NEPA documents as appropriate.

4.8.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.9 Water Resources - Surface/Ground Water

While the act of leasing federal minerals would produce no impacts to water resources, subsequent exploration and development of the lease parcels have the potential to produce impacts. The physical effects of mineral extraction include erosion, compaction, sedimentation, and potential groundwater contamination. Sedimentation and pollution of streams or wetlands can occur down-gradient from such activity sites (USDA 1999). Surface disturbance from the construction of well pads, access roads, pipelines, and utility corridors can result in degradation of surface water and groundwater quality from non-point source pollution, increased soil losses, and increased erosion.

4.9.1 Surface Water Resources

4.9.1.1 Proposed Action

Potential impacts to surface water that may occur from construction of well pads, access roads, fracturing ponds, pipelines, utility lines and production include:

- Increased surface runoff and off-site sedimentation brought about by soil disturbance
- Increased salt loading and water quality impairment of surface waters
- Channel morphology changes due to road and pipeline crossings and possible contamination of surface waters by spills

The magnitude of these impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, amount of local precipitation, soil character, and duration and time before implementation mitigation or clean up measures can be put into place.

Minor long-term direct and indirect impacts to the watershed could occur from water discharge from roads, road ditches, and well pads, but would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and powerlines have taken place. Interim reclamation of the portion of the well pad not needed for production operation, re-vegetating the portion of the pad that is needed for production operations, and re-vegetating road ditches would reduce this long-term impact. Short-term direct and indirect impacts to the watershed from future access roads that are not surfaced with impervious materials would occur and would likely decrease in time due to reclamation efforts.

4.9.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and

production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.9.1.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM will closely analyze areas proposed for drilling in APDs during the onsite inspection, since regional wetland inventories often do not capture small wetlands. USEPA requires that Storm Water Pollution Prevention Plans and SPCCP be in place to prevent any spill from reaching surface water due to rain events or accidental release of fluids related to production operations.

A BLM freshwater aquatic habitat stipulation is attached to the EOI #2254 and 2261 leases. The stipulation states that to protect the water quality of watersheds and natural stream substrate and morphology and to avoid potential impacts to aquatic species and their habitat, no surface occupancy or disturbance, including discharges, are permitted within 250 feet of a river, stream, wetland spring, headwater, wet meadow, wet pine savanna, pond, tributary, lake, coastal slough, sand bar, vernal pools, calcareous seepage marsh, or small, marshy calcareous stream. If the slope exceeds 10 percent, the buffer may be extended to 600 feet to provide adequate protection for aquatic habitats and associated species. An exception may be granted if the operator agrees to 1) span creeks, rivers, wetlands, and floodplains by attaching pipelines to bridges; 2) directionally drill wells and pipelines from upland sites under creeks, rivers, other waters, and wetlands or 3) implement other measures developed in consultation with USFWS and in coordination with State agencies. A modification may be approved and the buffer reduced if the adjacent waterway has been surveyed for 100 yards upstream and 300 yards downstream of the site, and the results document the lack of suitable/occupied/critical habitat for listed species which may be affected by the project, as determined by the BLM and USFWS.

4.9.2 Ground Water Resources

4.9.2.1 Proposed Action

Groundwater can be affected by multiple factors, including industrial, domestic, or agricultural activities through withdrawal, injection (including chemical injection), or mixing of materials from different geologic layers or the surface. Withdrawal of groundwater could affect local groundwater flow patterns and create changes in the quality or quantity of the remaining groundwater. Loss of a permitted source of groundwater supply due to drawdown would be considered a significant impact if it were to occur and any potential for this to occur would be assessed at the development stage should development be proposed. The drilling of horizontal wells, versus directional and vertical wells may initially appear to require a greater volume of water for drilling/completion purposes. However, a horizontal well develops a much larger area of the reservoir than a directional and/or vertical well and actually results in a lesser volume of fluids being required. Vertical and directional wells can easily require one well per 10 acres resulting in 64 wells per section. This is in contrast to one horizontal well per 640 acres or one per 320 acres which results in a net decrease in total fluid volumes needed and in surface disturbance acreages. Impacts to the quality of groundwater from future development, should

they occur, would likely be limited to near a well bore location due to inferred groundwater flow conditions in the area of the parcel.

Oil and gas contained in geologic formations is often not under sufficient hydraulic pressure to flow freely to a production well. The formation may have low permeability or the area immediately surrounding the well may become packed with cuttings. A number of techniques are used to increase or enhance the flow. They include hydraulic fracturing and acid introduction to dissolve the formation matrix and create larger void space(s). The use of these flow enhancement techniques and secondary recovery methods result in physical changes to the geologic formation that will affect the hydraulic properties of the formation. Typically, the effects of these techniques and methods are localized to the area immediately surrounding the individual well, are limited to the specific oil and gas reservoir, and do not impact adjacent aquifers.

In recent years there has been an elevated public concern about the possibility of subsurface hydraulic fracturing operations creating fractures that extend well beyond the target formation to water aquifers, allowing CH_4, contaminants naturally occurring in formation water, and fracturing fluids to migrate from the target formation into drinking water supplies (Zoback et al 2010). Typically, thousands of feet of rock, including some impermeable, separate most major formations in the U.S. from the base of aquifers that contain drinkable water (U.S. Department of Energy, 2009). The direct contamination of underground sources of drinking water from fractures created by hydraulic fracturing would require hydrofractures to propagate several thousand feet beyond the upward boundary of the target formations through many layers of rock. It is extremely unlikely that the fractures would ever reach fresh water zones and contaminate freshwater aquifers (Zoback et al 2010). During the APD review, the exact difference between the base of treatable water and the top of the target formation for the specific site would be reviewed to determine the potential for direct contamination of underground sources.

Contamination of groundwater could occur without adequate cementing and casing of a well bore. For fracturing fluid to escape the wellbore and affect the usable quality water or contaminate or cross contaminate aquifers, the fluid would have to breech several layers of steel casing and cement. Failure of the cement or casing surrounding the wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, fracturing fluids, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling and hydraulic fracturing, allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination.

Casing specifications are designed and submitted to the BLM. The BLM independently verifies the casing program, and the installation of the casing and cementing operations are witnessed by a Petroleum Engineer. Petroleum products and other chemicals used in the drilling and/or completion process could result in groundwater contamination through a variety of operational sources including but not limited to pipeline and well casing failure, well (gas and water)

construction, and spills. Similarly, improper construction and management of reserve and evaporation pits could degrade ground water quality through leakage and leaching.

The potential for negative impacts to groundwater caused from completion activities such as hydraulic fracturing has not been confirmed but based on its history of use are not likely. A recent study completed on the Pinedale Anticline did not find a direct link to known detections of petroleum hydrocarbons to the hydraulic fracturing process. Authorization of the proposed project would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection and the BLM would deny any APD who proposed drilling and/or completion process was deemed to not be protective of usable water zones as required by 43 CFR 3162.5-2(d).

A high risk of fluid migration exists along the vertical pathways created by inadequately constructed wells and unplugged inactive wells. Brine or hydrocarbons can migrate to overlying or underlying aquifers in such wells. Since the 1930s, most States have required that multiple barriers be included in well construction and abandonment to prevent migration of injected water, formation fluids, and produced fluids. These barriers include (1) setting surface casing below all known aquifers and cementing the casing to the surface, and (2) extending the casing from the surface to the production or injection interval and cementing the interval. Barriers that can be used to prevent fluid migration in abandoned wells include cement or mechanical plugs. They should be installed (1) at points where the casing has been cut, (2) at the base of the lowermost aquifer, (3) across the surface casing shoe, and (4) at the surface. Individual States, and the BLM have casing programs for oil and gas wells to limit cross contamination of aquifers.

Impacts of water use for oil and gas development and production depend on local water availability and competition for water from other users. Overall, impacts range from declining water levels at the regional or local scales and related decreases in base flow to streams (Nicot & Scanlon, 2012). Water supplied for hydraulic fracturing could come from surface or groundwater sources. If surface water is used, there could be a temporary decrease in the source's water levels depending upon the conditions at the time of withdrawal. The time it takes to return to baseline conditions is dependent on the amount of rainfall received and other competing uses of the resource.

Typically, when groundwater is used as a source of drilling/completion water, impacts to the aquifer would be minimal due to the size of the aquifers impacted and recharge potential across the entire aquifer. However, localized aquifer effects could be expected depending upon the rate of drawdown and the density and/or intensity of the drilling activity. A cone of depression may occur in the immediate vicinity of the existing water well used to supply the drilling/completion water. With each rain event, the aquifer is expected to recharge to some degree, but it is unknown if or when it would recharge to baseline conditions after pumping ceases which is dependent upon surface conditions (whether impervious surface or not). The time it takes depends greatly on rainfall events, surface soil materials, drought conditions, and frequency of pumping that has already occurred and will continue to occur into the future. The amount of water actually used for drilling/completion activities is highly dependent on a number of factors including: length of well bore, closed-loop or reserve pit drilling system, type of mud, whether hydraulic fracturing would be used during stimulation, whether recycled water would be used,

dust abatement needs, and type and extent of construction, to name a few. The impacts of water use on water quality and quantity would be analyzed in more detail during the APD review.

Any proposed drilling/completion activities would need to comply with Onshore Order #2, 43 CFR 3160 regulations, and not result in a violation of a federal and/or state law. If these conditions were not met, the proposal would be denied.

4.9.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.9.2.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM recommends that fluid impermeable containment systems (i.e. liners, dikes, berms) be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to prevent chemicals from penetrating the soil and impacting the aquifer or from moving off-site to a surface water source.

4.10 Wetlands/Riparian Areas/Floodplains

4.10.1 Proposed Action

While the act of leasing federal minerals would produce no direct impacts to wetland/riparian areas/floodplains, these areas could be adversely impacted by subsequent mineral development (drilling, hydraulic fracturing, production, et.) by changing the water quality or quantity (chemical spills, storm water runoff, etc.). The proposed parcels EOI #2254 and 2255 lie within the Mississippi River floodplain and near the Black River. EOI #2254 is located within and adjacent to Grassy Lake. EOI #2261has an open and forested wetland located on the proposed parcel. Potential affects to these areas are the same as those described in Section 4.9.1, Surface Water.

4.10.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.10.3. Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

To protect the water quality of watersheds and natural stream substrate and morphology and to avoid potential impacts to aquatic species and their habitat, the BLM stipulation regarding freshwater aquatic habitat applies to EOI #2254 and 2261 leases and would protect the water bodies located on these parcels (Appendix A).

4.11 Invasive/Exotic Species

4.11.1 Proposed Action

While the act of leasing federal minerals would not contribute to the spread or control of invasive or non-native species, subsequent exploration/development may. Any surface disturbance could establish new populations of invasive non-native species, although the probability of this happening cannot be predicted using existing information. Noxious weed seeds can be carried to and from the project areas by construction equipment, the drilling rig and transport vehicles. At the APD stage, BLM requirements for use of weed control strategies would minimize the potential for the spread of these species.

4.11.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.11.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Specific mitigation measures would be identified at the APD stage once site-specific development plans are determined. BMPs require that all federal actions involving surface disturbance or reclamation take reasonable steps to prevent the introduction or spread of noxious weeds, including requirements to use weed-free hay, mulch and straw. A BLM COA applies to all APDs, should federal minerals be accessed, which recommends that native cover plants in seeding mixtures be used during reclamation activities. Post-construction monitoring for cogon grass and other invasive plant species should be conducted to ensure early detection and control. If invasive species are found, the proper control techniques should be used to either eradicate the species from the area or minimize its spread to other areas. If cogon grass is found on site, equipment should be washed before exiting the site to prevent the spread of this highly invasive species to other locations.

4.12 Vegetation and Wildlife

4.12.1 Proposed Action

There would be no direct impacts to vegetation and wildlife from leasing, since there is no surface disturbance at this stage; however, reasonably foreseeable oil and gas development could result in short and long term impacts to vegetation and wildlife in the sections containing EOI

#2254, 2255, and 2261 where development occurs. Short term impacts to vegetation from future development would primarily result from removal of vegetation for construction of well pads and associated infrastructure. Long-term vegetation loss could include those portions of the well pad needed for production operations for the life of the well and access road.

Impacts to wildlife could result from increased habitat fragmentation, noise, or other disturbance during development. Although reclamation and restoration efforts for surface disturbance could provide for the integrity of other resources, these efforts may not always provide the same habitat values (e.g. structure, composition, cover, etc.). Short-term negative impacts to wildlife would occur during the construction and production phase of the operation (drilling, fracturing, production, etc.) due to noise and habitat destruction. In general, most wildlife species would become habituated to the new facilities. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic, noise and equipment maintenance. The magnitude of above effects would be dependent on the rate and location of the oil and gas development, but populations could likely not recover to pre-disturbance levels until the activity was completed and vegetative community restored.

Many of the common species expected to occur on the lease parcels have broad habitat requirements and would continue to be found in a variety of habitats in the surrounding areas. Wildlife use of the site after the well is put into production would vary depending on vegetation and succession stage. Once put into production, the well pad would be reduced in size and the reserve pit would be graded and seeded. The producing well site would be subject to regular maintenance and inspection. Wildlife use of the site is dependent on the adequacy of restoration. However, over the life of the well, some of the acreage would be excluded from utilization by most wildlife species.

4.12.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.12.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. Prior to authorization, activities would be evaluated on a case-by-case basis, and the project would be subject to mitigation measures. Mitigation could potentially include rapid re-vegetation, noise restrictions, project relocation, or pre-disturbance wildlife species surveying.

A standard BLM COA would apply at the APD stage that is designed to prevent bat and bird mortality, should federal minerals be accessed. The COA states that all open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and

constructed to prevent birds and bats from entering or nesting in or on such units, and to the extent practical, to discourage birds from perching on the stacks. Installing cone-shaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

4.13 Special Status Species

4.13.1 Proposed Action

There would be no direct impacts to special status species from leasing, since there is no surface disturbance at this stage; however, reasonably foreseeable oil and gas development could result in short and long term impacts to federally listed species in the sections containing EOI #2254, 2255, and 2261 where development occurs. Tables 4-1 and 4-2 list BLM effect determinations for these species and rationale for those determinations.

Table 4-1. BLM effect determinations for species documented by USFWS to occur in Catahoula Parish.

Species	Federal Status	BLM Effect Determination	Rationale
Northern long-eared Bat (*Myotis septentrionalis*)	Threatened	May affect, not likely to adversely affect	Suitable habitat present
Red-cockaded Woodpecker (*Picoides borealis*)	Endangered	No effect	No suitable habitat present
Pallid Sturgeon (*Scaphirhynchus albus*))	Endangered	No effect	No suitable habitat present
Louisiana Black Bear (*Ursus americanus luteolus*)	Recovered	No official determination made due to delisting	Suitable habitat present

BLM has determined that reasonably foreseeable oil and gas development that could occur on EOI #2254 and 2255 may affect, but is not likely to adversely affect the northern long-eared bat. BLM has determined that reasonably foreseeable oil and gas development would have no effect on the red-cockaded woodpecker or pallid sturgeon due to unsuitable habitat. No official determination is being made for the Louisiana black bear due to the species being delisted.

Table 4-2. BLM effect determinations for species documented by USFWS to occur in Bienville Parish.

Species	Federal Status	BLM Effect Determination	Rationale
Northern long-eared Bat (*Myotis septentrionalis*)	Threatened	May affect, not likely to adversely affect	Suitable habitat present
Red-cockaded Woodpecker (*Picoides borealis*)	Endangered	May affect, not likely to adversely affect	Potential habitat present
Louisiana Pine Snake (*Pituophis ruthveni*)	Candidate	May affect, not likely to adversely affect	Suitable habitat present
Texas Emerald (*Somatochlora margarita*)	Under Review	No effect	No suitable habitat present
Louisiana Black Bear (*Ursus americanus luteolus*)	Recovered	No official determination made due to delisting	Suitable habitat present

BLM has determined that reasonably foreseeable oil and gas development that could occur on EOI #2261 may affect, but is not likely to adversely affect red-cockaded woodpecker, northern long-eared bat, and Louisiana pine snake. BLM has determined that reasonably foreseeable oil

and gas development would have no effect on the Texas emerald dragonfly due to unsuitable habitat. No official determination is being made for the Louisiana black bear due to the species being delisted.

Threatened and endangered species may be disturbed during construction, drilling, or hydraulic fracturing operations, as these activities involve many vehicles, mobile and non-mobile heavy equipment, and numerous noise-producing equipment (i.e. generators, compressors). The most significant impacts would be limited to the construction, drilling, and completion/stimulation phases, which can span from several weeks to several months and is entirely dependent on the size and extent of new surface disturbance, length of the well bore, formations encountered during drilling, or whether hydraulic fracturing is used, just to name a few factors. During production, impacts from noise and human disturbance would greatly diminish with time. In general, most wildlife species would become habituated to the disturbances. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic from inspectors and semi-trucks hauling produced fluids, noise from compressors and/or a pump-jack if needed, and equipment maintenance. These impacts would last for the life of the well.

Activities associated with oil and gas production that could occur from development on the proposed lease could result in decreased use of this site by threatened and endangered species. Human noise and activity associated with production could cause wildlife to move elsewhere. In addition, a decrease in available habitat due to construction of well pads and access roads could also cause wildlife to move to surrounding areas. Reclamation of well pads could allow for species to use the sites again as long as reclamation creates similar habitats to what was originally there.

However, mitigation measures as described below will minimize potential affects that could occur from development of the proposed parcel.

4.13.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.13.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

A BLM stipulation regarding rare species applies to this proposal. The BLM stipulation states that the BLM may recommend modifications to exploration and development proposals to further the conservation and management objectives for threatened, endangered, or other special status plant or animal species or their habitat to avoid BLM-approved activity that would contribute to a need to list such a species or their habitat. To protect threatened, endangered, candidate, proposed, and BLM sensitive plant species, a second stipulation applies to this lease. The stipulation states that all suitable special status plant species habitat will be identified during

environmental review of any proposed surface use or activity. If field examination indicates that habitat of one or more of these species is present, the BLM will require a survey by a qualified botanist for special status plants during periods appropriate to each species. Operations will not be allowed in areas where sensitive plants would be affected.

A BLM bat stipulations is attached to all three proposed leases (Appendix A). The stipulation states that no surface occupancy or disturbance will be permitted within 10 miles of documented hibernacula, 5 miles of maternity roosts, and 2.5 miles of non-maternity record locations for this species. Informal consultation with USFWS would occur at the APD stage if it is determined that the project could have an effect on the northern long-eared bat.

Two BLM RCW stipulations are attached to EOI #2261 (Appendix A). The first stipulation states that no surface occupancy or disturbance will be permitted within 0.5 mile of a red-cockaded cluster, defined as an area containing all active and inactive cavity trees and a 200-foot buffer zone surrounding that area. Vehicle use is prohibited within a cluster except for through-travel on existing, maintained, paved roads. An exception may be granted to allow surface occupancy within 0.5 mile of a cluster if the operator agrees to measures developed in consultation with USFWS and in coordination with State agencies. A stipulation may be modified if a portion of the stipulated area is no longer within the 0.5-mile buffer zone or waived if no cluster can be identified within 0.5 mile of the leased tract.

The second BLM RCW stipulation states that, prior to activity in suitable RCW foraging habitat (defined as cover containing 50% pine trees over 10 inches in diameter and at least 30 years old) or nesting habitat (pines at least 60 years old and 10 inches in diameter), the applicant will conduct a survey of suitable habitat within ½ mile of the project according to protocols described in the updated Red-cockaded Woodpecker Recovery Plan, *Second Revision* completed by USFWS in 2003. If red-cockaded woodpeckers are found a biological assessment will be completed and the project modified as needed to ensure that there is "no adverse affect" with concurrence from the Lafayette Ecological Services Office of the USFWS.

A BLM LPS stipulation is attached to EOI #2261 (Appendix A). There will be no surface disturbance or activity permitted within suitable LPS habitat in areas containing current or historic LPS occurrence records in Bienville Parish, where proposed project parcel EOI #2261 is located, without a survey performed by a qualified biologist. This stipulation may be modified or waived if suitable LPS habitat does not exist on the proposed parcel. In lieu of a survey determining absence, presence is assumed and a Section 7 consultation would be required. Informal consultation with USFWS would occur at the APD stage if it is determined that the project could have an effect on the LPS.

4.13.4 Informal Consultation

BLM has determined that the proposed project will have no effect on the pallid sturgeon and Texas emerald dragonfly due to a lack of suitable habitat on the project site. BLM has determined that the project may affect, but is not likely to adversely affect the northern long-eared bat (for all EOIs) due to the presence of suitable roosting and foraging habitat, the red-

cockaded woodpecker due to the presence of potential foraging habitat on EOI #2261, and the Louisiana pine snake (on EOI #2261) due to the presence of suitable foraging and denning habitat. Informal consultation with USFWS, Louisiana Ecological Services Office (LESO) was initiated on February 1, 2017. A response letter was received on March 17, 2017 and is located in Appendix B.

There is no statutory requirement for USFWS to concur with a "no effect" determination so the LESO provided no additional comments or concerns regarding either the pallid sturgeon or the Texas emerald.

Because no surface disturbance is authorized and any surface disturbance would be addressed under a separate consultation, the USFWS concurred with the BLM determinations. Informal consultation will be initiated at the APD stage if it is found that there is suitable habitat for any of the species above at the specific project site.

4.14 Migratory Bird Species of Concern

4.14.1 Proposed Action

While the act of leasing would not affect migratory birds, subsequent exploration/development of the subject parcel may produce impacts. Surface disturbance from the development of well pads, access roads, pipelines, and utility lines can result in an impact to migratory birds and their habitat.

USFWS estimates that many migratory birds are killed annually throughout the U.S. in oil field production skim pits, reserve pits, and centralized oilfield wastewater disposal facilities. Numerous grasshoppers, moths, June bugs, and the like become trapped on the surface in tanks and on pits, and become bait for many species of migratory birds. Open tanks and pits then become traps to many species of birds protected under the MBTA. Properly covered tanks and pits (and regularly inspected covered tanks and pits) is imperative to the continued protection of migratory birds in the well pad area.

4.14.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.14.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Per the Memorandum of Understanding between BLM and USFWS, entitled, "To Promote the Conservation of Migratory Birds," the following temporal and spatial conservation measures must be implemented as part of the COAs with an APD:

1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.

2. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible.

3. If no migratory birds are found nesting in the proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.

To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds, the following standard BLM COAs would apply at the APD stage, should federal minerals be accessed:

- Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds

- All power lines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee

4.15 Public Health and Safety

There would be no direct impacts to public health and safety from leasing, since leasing is an administrative action. Public health and safety considerations associated with potential future oil and gas development include potential effects from air emissions, potential exposure to contamination, and increased truck traffic. BLM acknowledges that if the leasing area was to be developed in the future, environmental hazards of exploration, production or extraction of oil and gas may produce some effects to public health or safety if not properly managed. For an environmental hazard to pose a risk to public health, a vulnerable human population must first come into contact or be exposed to the hazard. Therefore, communities or workforce residing or working near the potential development sites may be at higher risk for accidental spills, fugitive emissions or releases of gas from a future well bore. The level of effect would depend on the product released or spilled, level of activity, density of development, technological and safety controls/regulations in place, and the receptors' susceptibility to risk.

As of 2014, most studies addressing the public health implications of oil and gas development have been either predictive and/or descriptive hypothesis generating. The few analytic studies are preliminary and do not provide enough evidence to conclusively determine if oil and gas

operations directly result in health effects in nearby populations. Existing studies have provided evidence that hazards are inherently present in and around oil and gas operations and populations can be exposed to these hazards if safety measures are not implemented. People living near oil and gas operations have reported that oil and gas operations affect their health and quality of life, particularly through traffic accidents, air and water pollution, and social disruption expressed as psychosocial stress (University of Colorado at Boulder, 2015). Some short term health effects reported by people living near oil and gas operations include irritation of the eyes, nose, throat, lungs or skin, or other symptoms like headache, dizziness or nausea and vomiting. Some also report sleep disturbance or anxiety associated with noise or light effects from mineral development activities. There is very little information about long term health effects in people living near oil and gas operations. The amount of scientific literature connections between oil and gas related exposures and a health effect is currently limited but is growing (Colorado Department of Public Health and Environment (CDPHE), 2016).

One of the primary ways in which the public could be exposed to pollutants associated with potential future oil and gas operations is through the air. There is also the possibility of exposure through surface water, groundwater or soil, but this is much less likely under normal operating conditions due to the numerous safety protocols implemented by oil and gas operations (CDPHE, 2016). Numerous scientific studies have linked air pollution to a variety of health problems including: (1) respiratory and cardiovascular disease, (2) decreased lung function, (3) increased frequency and severity of respiratory symptoms such as difficulty breathing and coughing, (4) increased susceptibility to respiratory infections, (5) effects on the nervous system, including the brain, such as IQ loss and impacts on learning, memory, and behavior, (6) cancer, and (7) premature death. Sensitive individuals or those at high risk appear to be at even greater risk for air pollution-related health effects, for example, those with pre-existing heart and lung diseases (e.g., heart failure/ischemic heart disease, asthma, emphysema, and chronic bronchitis), diabetics, older adults, and children. Future mineral development operations on this lease parcel that would violate a state and/or federal air quality standard would not be approved.

Future mineral development within this lease parcel would likely result in a minor increase in truck traffic, noise, and potential visual and light pollution effects. As discussed throughout this EA, potential effects from possible future oil and gas operations on the lease parcel would be minimized through the application of best management practices, standard operating procedures, and potential mitigations.

4.16 Transportation

Leasing minerals within the proposed parcel would not result in any direct impacts to the existing transportation network in the vicinity of the site since there would be no ground disturbance associated with leasing. Potential impacts to existing roads and traffic patterns may occur, however, from future mineral development. As discussed in the RFDS for this parcel, an access road may be needed to support future oil and gas development. Adequate access to a well can be provided by:

- Using existing roads, some of which may need upgrading;
- Constructing a new road; or/and
- A combination of both.

Due to the undeveloped nature of the lease parcels, new road construction would likely be needed. Since the proposed parcels are small in size, potential clearing needed for an access road would not be extensive.

Heavy vehicles may cause paved roads in the vicinity of the lease parcel to crack, or deteriorate, especially along the edges of the narrower roadways. Gravel and dirt roads may be subject to the formation of ruts, potholes, and washboard effects. The level of impact is dependent upon the amount of activity, weather conditions during the activity and the level of road maintenance. The greatest effects would likely occur for a relatively short duration during the drilling and plugging phases of future oil and gas operations which usually require the use of heavy vehicles and equipment.

Future mineral development within the proposed lease parcels would likely result in a minor increase in truck traffic to the area, resulting in a slight increase in risk of potential collisions with wildlife crossing the roads, such as the white-tailed deer. Increased particulate matter in the form of dust from vehicular traffic would impair visibility, decrease potential browsing, pollinating, and nesting for wildlife, and impair vegetative growth on the edges of unimproved roadways. Effects to traffic patterns on the nearby road system may vary depending on the location(s) of the future well(s) and the time of day the roads are used. Increases in vehicle traffic associated with potential future mineral development may result in periodic traffic-related inconveniences. An increase in truck traffic may also increase the risk of potential traffic-related accidents. After exploration and drilling, the vehicle traffic would decline but would still be subject to the occasional need for vehicle access to the well site.

4.17 Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from 'the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Recent CEQ guidance in considering cumulative effects involves defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographical and temporal overlaps among the Proposed Actions and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between the Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated.

To identify cumulative effects, three fundamental questions need to be addressed:

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?

- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?

- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the affected area includes the proposed lease area and surrounding vicinity.

4.17.1 Context for Cumulative Effects Analysis

Offering the subject parcel for lease, and the subsequent issuance of the leases, in and of itself, would not result in any cumulative impacts; however, the Proposed Action does include an analysis of the potential reasonably foreseeable oil and gas development that could occur in the future associated with the lease parcels, which serves as the basis for assessing whether there could be any cumulative effects associated with the possible future development of the lease parcels. The 50.15 acres of federal mineral estate could potentially add 4 horizontal wells from one pad on EOI #2261 if the parcels are leased and developed. To access the federal minerals for EOI #2254 and 2255, potential wells would be drilled vertically; however, drilling will occur within the section containing EOI #2254 and 2255 but not on the lease parcels themselves.

4.17.2 Cumulative Effects Analysis

The area surrounding EOI #2254 and 2255 is a low activity area of mostly dry holes and approximately 17-18 oil wells within one mile of EOI #2254 and 2255, mainly to the south and west. All are located within the Wilcox formation. EOI #2261 is located in an area of very low oil and gas activity. Only 3 dry holes are present within one mile and 18-20 dry holes within two miles. One producing oil well is located approximately 2 miles to the southeast of EOI #2261. The wells in this area are targeting the Bossier, Haynesville or a combination of these formations.

Because of the small size of EOI #2254, 2255, and 2261 (50.15 acres) and the small amount of foreseeable development projected under the RFD scenario (14.97 acres), the incremental effect of the Proposed Action and No Action Alternative in combination with other past, present, or reasonably foreseeable actions on resources including land use, visual/noise resources, vegetation and wildlife (including invasives and migratory birds), soil resources, cultural resources, water resources, soils, and wastes is negligible to minor. Further site-specific NEPA analysis will be conducted at the APD stage, along with additional consultations and surveys as required. Further NEPA analysis at the APD stage will address cumulative impacts of any proposed development at the site-specific level; however, this EA does discuss cumulative impacts from leasing on a general level. Following is a discussion of potential cumulative effects associated with the Proposed Action and No Action Alternative.

Land Use

There would be no cumulative impacts to land use as a result of leasing EOI #2254, 2255, and 2261; however, the RFD scenario projects approximately 14.97 acres of surface disturbance associated with reasonably foreseeable development from potential future oil and gas activities. The area surrounding EOI #2254, 2255, and 2261 is rural with minimal development. Other activities occurring in the area includes forestry and agriculture, which over time may contribute to changes in existing land uses if these activities are changed or expanded. Potential future development associated with the leasing of EOI #2254, 2255, and 2261 would contribute minimally to land use conversion in the area and is consistent with ongoing uses of the land in the general vicinity of the proposed lease parcels. Therefore, there would be no perceptible cumulative impacts to land use from implementing the Proposed Action and No Action Alternative.

Visual/Noise Resources

There would be no cumulative impacts to visual and noise resources as a result of leasing EOI #2254, 2255, and 2261; however, the RFD scenario projects approximately 14.97 acres of surface disturbance associated with reasonably foreseeable development from potential future oil and gas activities. Because the area surrounding EOI #2254, 2255, and 2261 is largely rural with minimal development, there are few noise-generating activities in the area above and beyond those typical of a rural, agricultural area. Agriculture activities typically do not produce noise levels that would result in noise ordinance violations. Because the other activities in the area are spatially separated, the Proposed Action and No Action Alternative would not result in a cumulative impact to the noise or visual environment.

Cultural Resources and Native American Concerns

There would be no cumulative impacts to cultural resources as a result of leasing EOI #2254, 2255, and 2261; however, potential cumulative effects to cultural resources could occur if future development activities on or near the parcels are conducted without proper surveys and consultations under the NHPA or state requirements. Cumulative effects from repetitious illegal activity, primarily archeological vandalism, may occur on certain sites or site types unless perpetrators are apprehended and prosecuted. The degree of cumulative effects to known properties from BLM activities, however, should be slight as inventory, assessment, protection, and mitigation measures would be implemented at the APD stage if federal minerals are accessed. Under the No Action Alternative, operators in the vicinity would be required to comply with all required laws and regulations with regard to protection of cultural resources and Native American Concerns.

Socioeconomics and Environmental Justice

Cumulative effects to socioeconomics from reasonably foreseeable future development would likely be positive, but minor. At this time, it is not possible to determine with certainty the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in Catahoula and Bienville Parishes. Additional analysis will be conducted

at the APD stage where socioeconomic impacts will be further assessed. Many of the cumulative socioeconomic effects and impacts associated with oil and gas development are already occurring in the region and would be perpetuated in the future. For instance, oil and gas activity is generating employment opportunities and labor earnings for communities that support these types of activities.

The Proposed Action and No Action Alternative would not disproportionately affect low income or minority populations; therefore, there would be no cumulative effects to these groups.

Soils

Increases in mineral development, construction activities, and the conversion of land to developed landscapes collectively result in the removal of vegetation, long-term reduction in vegetation cover, and disturbance of soils. This would expose soils to the erosive forces of wind and water, destabilize soils, and increase overland flow, which in turn could result in accelerated erosion. Accelerated erosion could mobilize soils and remove nutrient-rich topsoil, and thereby reduce soil productivity and vegetation growth rates. Because the proposed lease parcels are small and reasonably foreseeable future development under the RFD scenario is only 14.97 acres, the incremental effect of the Proposed Action and No Action Alternative with other activities on soils in the vicinity would be small. Cumulative impacts to soil resources would therefore be negligible.

Mineral Resources

There would be no cumulative impacts to minerals from the administrative action of leasing EOI #2254, 2255, and 2261, but the potential reasonably foreseeable development projected under the RFD scenario in combination with other mineral development activities in the area would result in a minor incremental effect from development on BLM federal mineral estate. At this stage it is uncertain how productive the wells accessing the federal mineral estate would be, should development occur in the future. If developed, the mineral resources would be drained and depleted over time, but given the small size of the lease parcels the incremental cumulative effect would be minor compared to other mineral development activities occurring in the vicinity.

Wastes

As noted in the Proposed Action description, impacts from waste storage, handling, and disposal would be minimized through the use of BMPs, SOPs, and COAs at the APD stage, should federal minerals be proposed for development. Other mineral development, agriculture, and timber management activities in the area would need to comply with all required laws and regulations with regard to wastes. Therefore, cumulative effects from wastes are not anticipated.

Natural Resources (Vegetation and Wildlife, Special Status Species, Invasive Species, Migratory Birds)

The Proposed Action and No Action Alternative would contribute a minor amount of potential vegetation loss from reasonably foreseeable development. Under the RFD scenario,

approximately 14.97 acres of surface disturbance could occur from future oil and gas activities associated with EOI #2254, 2255, and 2261. The loss of vegetation would also affect wildlife using that habitat, although many species would likely relocate during construction from future development activities. Reclamation activities would help restore vegetation conditions. Future site-specific analysis would be conducted at the APD stage. Given the small size of the parcels and projected surface disturbance, cumulative effects to vegetation, wildlife, special status species, and migratory birds would be minor and cumulative effects to the population level of species are not expected. In short, cumulative impacts associated with continued oil and gas development in the area could include displacement of threatened and endangered species to surrounding areas or a decrease in population viability if suitable habitat is not available in the surrounding area. The Proposed Action would not be expected to significantly compound current patterns of habitat fragmentation, degradation, or wildlife patterns. If BLM weed control strategies are implemented, cumulative effects due to invasive species are not anticipated.

Water Resources (Surface and Ground Water, Floodplains, Riparian Areas, and Wetlands)

There would be no cumulative impacts to water resources from the administrative action of leasing EOI #2254, 2255, and 2261, however, energy and mineral development, construction activities, agriculture, and the conversion of land to developed landscapes, collectively results in the removal of vegetation, long-term reduction in overall vegetation cover, and disturbance of soils. This would increase overland flow, result in accelerated soil erosion, and decrease the ability of watersheds to buffer high flows and filter water, sediment, and nutrients. Soil mobilized by wind and water erosion would be transported downslope and to nearby water bodies, which would increase sediment and nutrient loads to streams, rivers, lakes, and reservoirs and thereby degrade water quality. Increases in overland flow also would directly increase the amount of water transported to streams and rivers, which could lead to increased downcutting, widening, and overall degradation of stream channels. Because of the small size of the parcel and only 14.97 acres of surface disturbance are projected under the RFD scenario, the incremental effect of the Proposed Action and No Action Alternative would result in negligible cumulative effects to surface water.

Oil and gas wells have the potential to affect groundwater quality and quantity through withdrawal, injection, and unintentional leakage and spills. Proper well design, construction, drilling, and completion methods would reduce the likelihood of these impacts but would not entirely eliminate them. Hydraulic fracturing is used to enhance recovery by enlarging fractures through which oil and gas can be drawn to a wellbore and brought to the surface. After fluids are injected at high pressures to expand fractures, injected fracture fluids and some formation water flows back to the surface and is removed to allow gas and/or oil to flow into the wellbore. In recent years there has been an elevated public concern about the possibility of subsurface hydraulic fracturing operations creating fractures that extend well beyond the target formation to water aquifers, allowing methane, contaminants naturally occurring in formation water, and fracturing fluids to migrate from the target formation into drinking water supplies (Zoback et al 2010). Contamination of groundwater could occur without adequate cementing and casing of the proposed well bore. For completion or formation fluids to escape the wellbore and affect the usable quality water or contaminate or cross contaminate aquifers, the fluid would have to breech several layers of steel casing and cement. Failure of the cement or casing surrounding the

wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, fracturing fluids, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling and hydraulic fracturing, allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination. Cumulative effects to ground water are not anticipated if SOPs, BMPs, and COAs as described in this EA and identified during the APD process are followed, should federal minerals be proposed for development.

Air Quality

Cumulative effects from potential oil and gas development from the proposed leases and possible future development could be an overall increase in CO, NOx, SO_2, Pb, PM, CO_2, CH_4, and N_2O. However, according to USEPA's Air Trends report for 2011 (USEPA 2011), since 1990, nationwide air quality has improved significantly for the six common air pollutants (Figure 4-1). These six pollutants are ground-level O_3, $PM_{2.5}$, PM_{10}, Pb, NO_2, CO, and SO_2. Nationally, air pollution was lower in 2010 than in 1990 for:

- 8-hour O_3, by 17%
- 24-hour PM_{10} , by 38%
- 3-month average Pb, by 83%
- annual NO_2 , by 45%
- 8-hour CO, by 73%
- annual SO_2 , by 75%

Nationally, annual $PM_{2.5}$ concentrations were 24% lower in 2010 compared to 2001 and 24-hour $PM_{2.5}$ concentrations were 28% lower in 2010 compared to 2001. O_3 levels did not improve in much of the East until 2002, after which there was a significant decline. Eight-hour O_3 concentrations were 13% lower in 2010 than in 2001. This decline is largely due to reductions in NOx required by USEPA rules including the NOx State Implementation Plan (SIP) Call, preliminary implementation of the Clean Air Interstate Rule (CAIR), and Tier 2 Light Duty Vehicle Emissions Standards.

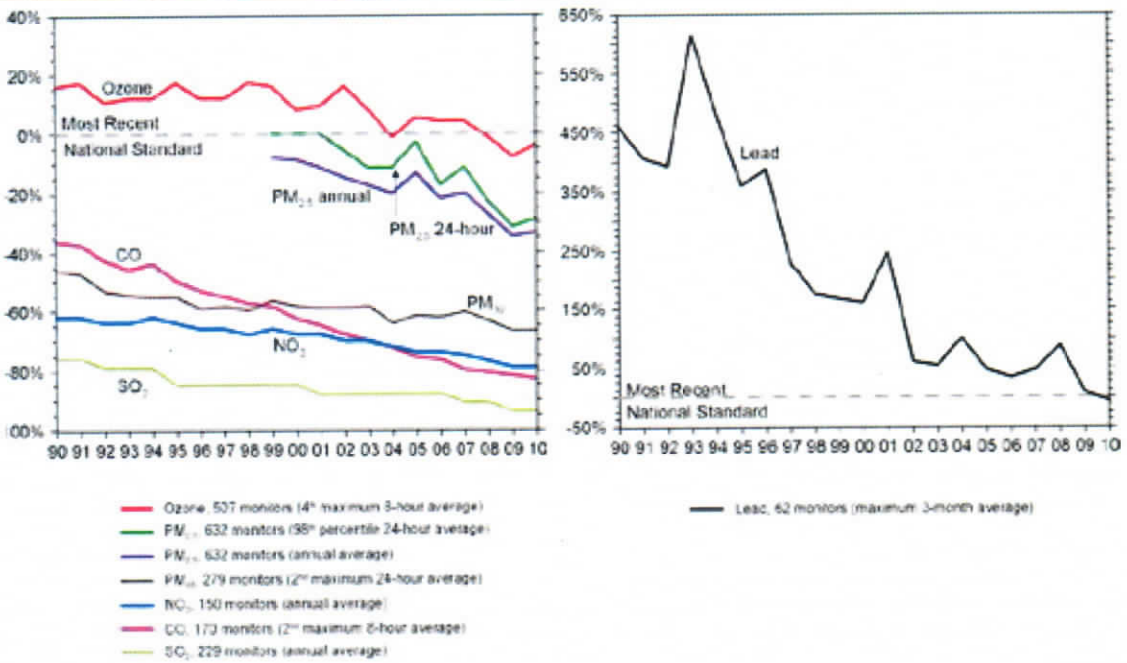

Figure 4-1. Comparison of national levels of the six common pollutants to the most recent NAAQS, 1990-2010. National levels are averages across all monitor stations with complete data for the time period. Note: Air quality data for $PM_{2.5}$ starts in 1999 (USEPA, 2011).

USEPA concludes that total emissions of toxic air pollutants have decreased by approximately 42% between 1990 and 2005. Control programs for mobile sources and facilities such as chemical plants, dry cleaners, coke ovens, and incinerators are primarily responsible for these reductions. They also found that monitored concentrations of toxic pollutants such as benzene, 1,3-butadiene, ethylbenzene, and toluene decreased by 5% or more per year between 2003 and 2010 at more than half of ambient monitoring sites. Other toxic air pollutants of concern to public health such as carbon tetrachloride, formaldehyde, and several metals, declined at most sites.

Climate

The administrative action of leasing would not result in any GHG emissions; however, potential future development would likely result in GHG emissions.

In October 2012, USEPA regulations that require control of VOC emissions from oil and gas development became effective. These regulations will reduce VOC emissions from oil and gas exploration and production emissions that contribute to the formation of O_3. Emissions from any lease development are not expected to impact the 8-hour average O_3 concentrations, or any other criteria pollutants in the area of the proposed lease. The Proposed Action would not result in a violation of any NAAQ or criteria pollutant in the area of the proposed lease.

The incremental contribution to global GHGs from the Proposed Action cannot be translated into effects on climate globally or locally, due to the uncertainties associated with ongoing scientific

research. When further information on the impact to climate is known, such information would be incorporated in the BLM's planning and NEPA documents as appropriate.

4.18 Irreversible and Irretrievable Commitments of Resources

NEPA Section 102(2)C requires a discussion of any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or disturbance to protected cultural resources). An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., extraction of any solid mineral ore or fluid mineral).

Reasonably foreseeable oil and gas development associated with the Proposed Action would result in a minor amount of surface disturbing activities that would result in irreversible or irretrievable commitments of resources. These surface disturbing activities would result in alterations to soil, removal of vegetation cover and wildlife habitat, and possible damage to cultural resources if proper surveys and consultations are not conducted under the NHPA. Increases in sediment and nonpoint source pollution that result from these activities could result in degradation of water quality within the watershed and habitat for aquatic-dependent species, although no major surface waters are located adjacent to the parcel. Use of BMPs, SOPs, COAs and stipulations as described in the EA are designed to reduce the magnitude of these impacts by preventing habitat degradation. Development of oil and gas wells would represent an irretrievable commitment of nonrenewable fossil fuels.

4.19 Relationship between Local Short-term Uses and Long-term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and of the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use eliminates the possibility of other uses being performed at the site.

The Proposed Action would take place within a relatively rural area with minimal development. No unique habitat or ecosystems would be lost due to this action. Implementation of the Proposed Action or No Action Alternative may result in future oil and gas development, which results in surface disturbing and other disruptive activities that remove vegetation, increase soil erosion and compaction, create visual intrusions and landscape alterations, increase noise, and degrade wildlife habitat. Although management actions, BMPs, surface use restrictions, and lease stipulations are intended to minimize the effect of short-term uses, some impact on long-term productivity of resources would occur. Because of the small size of the parcels and projected development under the RFD scenario, however, the level of impact would be minor.

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APPENDIX A: LEASE STIPULATIONS AND NOTICES FOR EOI #2254, 2255, and 2261

STIPULATIONS

BLM

Cultural Resources and Tribal Consultation

Stipulation: This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. These obligations may include a requirement that you provide a cultural resources survey conducted by a professional archaeologist approved by the State Historic Preservation Office (SHPO). If currently unknown burial sites are discovered during development activities associated with this lease, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate tribe/group of federally recognized Native Americans will take place. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.

Endangered Species

Stipulation: The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. ' 1531 et seq., including completion of any required procedure for conference or consultation.

Exception: None

Modification: None

Waiver: None

Sensitive Plant Species

Stipulation (CSU): All suitable special status plant species habitat will be identified during environmental review of any proposed surface use activity. If field examination indicates that habitat of one or more of these species is present, the BLM will require a survey by a qualified botanist for special status plants during periods appropriate to each species. Operations will not be allowed in areas where sensitive plants would be affected.

Objective: To protect threatened, endangered, candidate, proposed, and BLM sensitive plant species.

Exception: An exception may be granted if the operator agrees to implement measures developed in consultation with USFWS and in coordination with State agencies.
Modification: The stipulation may be modified if it is determined that a portion of the lease area does not contain sensitive plant species habitat.

Waiver: The stipulation may be waived if, based on field surveys, it is determined that the lease area does not contain sensitive plant species habitat.

Bats

Stipulation (NSO): No surface occupancy or disturbance would be permitted within 10 miles of hibernacula, 5 miles of maternity roosts, and 2.5 miles of non-maternity record locations for the following species: gray bat, Indiana bat, Ozark big-eared bat, northern long-eared bat, and Virginia big-eared bat.

Objective: To avoid adverse effects to special status bats.

Exception: An exception may be granted if the project would not result in adverse effects to these special status bats or their habitat, with concurrence from the USFWS.

Modification: None.

Waiver: This stipulation may be waived if the lease does not contain suitable habitat for gray bat, Indiana bat, northern long-eared bat, Ozark big-eared bat, Virginia big-eared bat, with concurrence from USFWS.

Freshwater Aquatic Habitat (Applicable to EOI#2254 and 2261)

Stipulation (NSO): No surface occupancy or disturbance, including discharges, are permitted within 250 feet of a river, stream, wetland spring, headwater, wet meadow, wet pine savanna, pond, tributary, lake, coastal slough, sand bar, vernal pools, calcareous seepage marsh, or small, marshy calcareous stream. If the slope exceeds 10 percent, the buffer may be extended to 600 feet to provide adequate protection for aquatic habitats and associated species.

> Objective: To protect the water quality of watersheds and natural stream substrate and morphology and to avoid potential impacts to aquatic species and their habitat.

Exception: An exception may be granted if the operator agrees to 1) span creeks, rivers, wetlands, and floodplains by attaching pipelines to bridges; 2) directionally drill wells and pipelines from upland sites under creeks, rivers, other waters, and wetlands or3) implement other measures developed in consultation with USFWS and in coordination with State agencies.

Modification: The buffer may be reduced if the adjacent waterway has been surveyed for 100 yards upstream and 300 yards downstream of the site, and the results document the lack of suitable/occupied/critical habitat for listed species which may be affected by the project, as determined by the BLM and USFWS.

Waiver: None

LEASE NOTICES/BEST MANAGEMENT PRACTICES

Migratory Birds and Federally Listed Wildlife

Objective: To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds and federally listed wildlife.

Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds.

All powerlines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee (APLIC 2006)

Perching and Nesting Birds and Bats

Objective: To prevent birds and bats from entering or nesting in or on open vent stack equipment.

Open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units and, to the extent practical, to discourage birds from perching on the stacks. Installing cone-shaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

Invasive and Non-Native Species

Objective: To discourage the spread of invasive, non-native plants.

Use of native or non-invasive plants in seeding mixtures will be encouraged to stabilize disturbed areas and during restoration activities. Construction sites will be surveyed for invasive species

prior to ground disturbance. If invasive species are found, the proper control measures will be used to either eradicate the species from the area or minimize its spread to other areas. If cogongrass is found on site, equipment will be washed before exiting the site to prevent the spread of this highly invasive species to other locations. Post-construction monitoring for cogongrass and other invasive plant species should be conducted to ensure early detection control. In the case of split-estate lands, final seed mixtures will be formulated in consultation with the private landowner.

Pesticide Application

Objective: To protect the water quality of watersheds and natural stream substrate and morphology supporting special status species and their host species.

Any ground application of herbicides or other pesticides, sterilants, or adjuvants within 150 feet of listed species or habitat will require site-specific control measures developed in coordination or formal consultation with USFWS. No aerial application of herbicides or pesticides will be permitted.

APPENDIX B: AGENCY AND TRIBAL CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

March 16, 2017

Mr. Jason Ross
Planning and Environment Specialist
Bureau of Land Management
Southeastern States District Office
273 Market Street
Flowood, MS 39232

Dear Mr. Ross:

Please reference your February 1, 2017, electronic mail (e-mail) and the attached "Biological Assessment (BA) for Proposed Federal Oil and Gas Lease Expression of Interest (EOI) #2254, 2255, and 2261 in Catahoula and Bienville Parishes, Louisiana." The subject BA addresses potential impacts of the proposed project to the endangered red-cockaded woodpecker (*Picoides borealis*), the threatened northern long-eared bat (*Myotis septentrionalis)*, the proposed Louisiana pine snake (*Pituophis ruthyeni*), and the delisted Louisiana black bear (*Ursus americanus luteolus*). The Fish and Wildlife Service (Service) has reviewed the information provided and offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

According to your BA, an EOI was submitted to the Bureau of Land Management (BLM) to lease subsurface federal minerals located under privately owned surface (split-estate) on three proposed parcels totaling 50.15 acres in Catahoula and Bienville Parishes, Louisiana. Two parcels, EOI #2254 and 2255, totaling 10.25 acres are located in Catahoula Parish. The natural vegetated community is classified as Southern Floodplain Forest; however, the majority of the area is cleared under intensive agriculture in the form of rice, soybeans, corn and commercial aquaculture activity. EOI #2261 is a 39.9 acre tract located in Bienville Parish and includes longleaf pine forests and savannahs, pitcher plant and orchid bogs, upland hardwood forests, calcareous prairies and forests, and sandstone forests consisting of drought-tolerant oaks and associated openings.

The actual issuance of a lease is an administrative action that would have no impact on listed species or habitats. However, the issuance of the lease would give the lessee exclusive rights to explore and develop oil and gas reserves on the lease. The issuance of a lease is considered to be an irretrievable commitment of resources because the lessee

would have access to surface use of the lease; however, the subject EOIs would be issued with a 'No Surface Occupancy" (NSO) stipulation (Appendix B of the BA). These NSO stipulations identify Best Management Practices that are designed to minimize adverse impacts to threatened and endangered species and are included in the lease agreement. The BLM requires applicants to adhere to the lease stipulations and notices for oil or gas drilling and production activities.

Prior to any well operation activities being authorized, the lessee is required to submit an "Application for Permit to Drill' (APD) to the BLM. In the APD, the company identifies a proposed drill site and provides the BLM with specific details on how and when drilling the well would occur within the constraints of the lease document. Upon receipt of an APD, BLM conducts an onsite inspection with the company, and when possible the surface managing agency. Site-specific analysis of individual wells, access roads, and other facilities would occur when a lease holder submits an APD. At the APD phase, the BLM would enter into Section 7 consultation with the Service and provide a site-specific biological assessment if the proposed disturbance may affect a federally listed or candidate species. Compliance with recommendations provided by the Service would be incorporated as a lease requirement, through a lease stipulation or notification.

In Appendix C of the BA, BLM provided an estimated rate of development using the "Reasonably Foreseeable Development Scenario" (RFD). The RFD projects that two or more vertical wells and 4 or more horizontal wells would be drilled from three well pads with only one pad having the additional possibility of including horizontal well(s) for a total of 15.0 acres disturbed. Well pads and pits would disturb 8.8 acres. An additional 4.82 acres would be disturbed for access roads. BLM also assume that approximately 0.6 acres would be reclaimed after wells are put in production for a net disturbance of 14.4 acres.

Analysis of Impacts to Listed Species

The proposed project would be located in a parish known to be inhabited by the endangered red-cockaded woodpecker (RCW, *Picoides borealis*). RCWs roost and forage year-round and nest seasonally (i.e., April through July) in open, park-like stands of mature pine trees containing little hardwood component, a sparse midstory, and a well-developed herbaceous understory. RCWs can tolerate small numbers of overstory and midstory hardwoods at low densities found naturally in many southern pine forests, but they are not tolerant of dense midstories resulting from fire suppression or from overstocking of pine. Trees selected for cavity excavation are generally at least 60 years old, although the average stand age can be younger. The collection of one or more cavity trees plus a surrounding 200 foot wide buffer of continuous forest is known as a RCW cluster. RCW foraging habitat is located within one-half mile of the cluster and is comprised of pine and pine-hardwood stands (i.e., 50 percent or more of the dominant trees are pines) that are at least 30 years of age and have a moderately low average basal area (i.e., 40 – 80 square feet per acre is preferred).

EOI #2254 and 2255 do not meet any of the habitat requirements for RCW potential. As a result, BLM has determined that there will be no effect on RCWs from potential future development that could occur from the proposed leases due to a lack of suitable habitat on EOI #2254 and 2255. EOI #2261 contains a significant pine component; however, preferred suitable habitat to support woodpecker colonies is not available at the proposed project site due to high pine basal area, a lack of suitable mid-story foraging area, and a lack of suitable pine tree age-class for nest cavity occurrence. There is a small potential that RCWs could occur on EOI#2261, although it is unlikely due to the reasons noted above. As a result, BLM has determined that future potential development that could occur from the proposed lease may affect but is not likely to adversely affect RCWs

To protect RCWs that could potentially occur on EOI #2261, a stipulation and lease notice is attached to this lease (Appendix B). The stipulation states that no surface occupancy or disturbance will be permitted within 0.5 mile of a RCW cluster, defined as the area containing all active and inactive cavity trees and a 200-foot buffer zone surrounding that area. Vehicle use is prohibited within a cluster except for through-travel on existing, maintained, paved roads. An exception may be granted to allow surface occupancy within 0.5 mile of a cluster if the operator agrees to measures developed in consultation with USFWS and in coordination with State agencies. This stipulation may be waived if no cluster can be identified within 0.5 mile of the leased tract. The lease notice states that prior to activity in suitable RCW foraging habitat (cover at least 50% pine trees over 10 inches in diameter and at least 30 years old) or nesting habitat (pines at least 60 years old and 10 inches in diameter), the applicant will conduct a survey of suitable habitat within ½ mile of the project according to protocols described in the updated RCW Recovery Plan, *Second Revision* completed by USFWS in 2003. If RCWs are found, a biological assessment will be completed and the project modified as needed to ensure that there is "no adverse effect" with concurrence from the Lafayette Ecological Services Office of the USFWS.

The northern long-eared bat (*Myotis septentrionalis*), federally listed as a threatened species, is a medium sized bat about 3 to 3.7 inches in length but with a wingspan of 9 to 10 inches and is distinguished by its long ears. Its fur color can range from medium to dark brown on the back and tawny to pale-brown on the underside. The northern long-eared bat can be found in much of the eastern and north central United States and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. In Louisiana, there have been confirmed reports of sightings in Winn and Grant parishes; although they can possibly be found in other parishes in the state. Some individuals were documented during mist net and bridge surveys on the Winn District of the Kisatchie National Forest and were also observed under bridges on the Winn District in Grant Parish.

Northern long-eared bats can be found in mixed pine/hardwood forest with intermittent streams. Northern long-eared bats roost alone or in small colonies underneath bark or in

cavities or crevices of both live trees and snags (dead trees). During the winter, northern long-eared bats can be found hibernating in caves and abandoned mines, although none have been documented using caves in Louisiana. Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges to feed on moths, flies, leafhoppers, caddis flies and beetles, which they catch using echolocation. This bat can also feed by gleaning motionless insects from vegetation and water surfaces.
The most prominent threat to this species is white-nose syndrome, a disease known to cause high mortality in bats that hibernate in caves. Other sources of mortality for northern long-eared bats are wind energy development, habitat destruction or disturbance, climate change and contaminants.

EOI #2254 and 2255 are approximately ten miles north/northwest of the Winn District and approximately twenty-five miles north/northwest of the Catahoula District of KNF. EOI #2261 is approximately fifty-five miles east of the Catahoula District and seventy miles east of the Winn District. Suitable summer roosting and year-round foraging habitat is available on EOI #2254, 2255, and 2261 for the northern long-eared bat. As a result, two bat stipulations are attached to the proposed leases (Appendix B). The first stipulation states that no surface occupancy or disturbance would be permitted within 10 miles of hibernacula, 5 miles of maternity roosts, and 2.5 miles of non-maternity record locations for the five federally listed bat species including the northern long-eared bat. The second stipulation states that no removal of trees or snags over 5 inches of diameter will be permitted between March 16 and November 30 within the known or potential range of the northern long-eared bat. An exception may be granted to these stipulations if the project would not result in adverse effects to this species or its' habitat, with concurrence from USFWS. Although there is suitable habitat for the northern long-eared bat on the proposed lease parcels, BLM has determined that that any future development that may occur from the proposed leases may affect but is not likely to adversely affect due to the attached stipulations.

The proposed project area would be located in a parish known to be inhabited by the Louisiana pine snake (*Pituophis ruthveni*), a proposed species for federal listing as a threatened or endangered species. Historically, the Louisiana pine snake occurred in portions of west-central Louisiana and east-central Texas. According to our records, the Louisiana pine snake is currently known to occur in Bienville, Sabine, Natchitoches, and Vernon Parishes, Louisiana, and in Angelina, Jasper, Newton, and Sabine Counties, Texas.

Louisiana pine snakes prefer pine forests with sandy, well-drained soils, substantial herbaceous ground cover, and little midstory (e.g., longleaf pine savannah). The Louisiana pine snake is highly associated with Baird's pocket gopher (*Geomys breviceps*), a major food source, which is dependent on the same habitat type. Louisiana pine snakes are most frequently found near or within pocket gopher burrow systems and move from one burrow system to another. Threats to this species include the sharp decline in quality and quantity of open pine forest habitat due to logging, suppression of fire, and short-rotation

silviculture, as well as vehicle-related mortality on roads and off-road trails. A more recently identified threat for many snake species is entanglement in filamentous mesh (particularly synthetic, non-biodegradable types) used in erosion control blankets (ECBs) installed on pipeline and road construction rights-of-ways has been documented (Kapfer and Paloski 2011). The extent of mortality caused by this threat to the Louisiana pine snake population is unknown.

EOI #2254 and 2255 are located on heavy clay soils under bottomland hardwoods or intensive agriculture. As a result, BLM has determined that that there will be no effect on LPS from the proposed project parcels EOI #2254 and 2255 due to lack of suitable habitat for LPS. BLM has determined that suitable habitat exists on proposed parcel EOI #2261.

Site-specific analysis would be conducted and ESA consultation initiated at the ADP stage if construction or operations may affect a federally listed or candidate species. For these reasons, we concur with your determination that implementation of the proposed lease issuance is not likely to adversely affect federally listed or proposed species.

Due to recovery, the Louisiana black bear was officially removed from the List of Endangered and Threatened Species on March 11, 2016 (effective April 11, 2016); critical habitat designation for this subspecies has also been withdrawn. Because the Louisiana black bear is no longer protected under the Endangered Species Act (ESA), consultation with the Service is not required for this subspecies. The Louisiana black bear remains protected, however, under Louisiana state law, and the Louisiana Department of Wildlife and Fisheries (LDWF) will continue to actively manage this subspecies. For additional information regarding the Louisiana black bear and conservation measures that may be required by the LDWF, please contact Maria Davidson (Large Carnivore Program Manager) at (337) 948-0255.

We appreciate the opportunity to coordinate with you on the proposed project. Please contact Ms. Amy Trahan of this office at 337/291-3126 if you have questions.

Sincerely,

Brad S. Rieck
Acting Field Supervisor
Louisiana Ecological Services Office

Literature Cited

Kapfer, J.M. and R. A. Paloski. 2011. On the threat to snakes of mesh deployed for erosion control and wildlife exclusion. Herpetological Conservation and Biology 6(1):1-9.

Sullivan, John <j35sullivan@blm.gov>

RE: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

THPO <thpo@ttown.org>
To: "Sullivan, John" <j35sullivan@blm.gov>

Wed, Feb 8, 2017 at 2:02 PM

Mr Sullivan,

Bienville and Catahoula Parish are out of our area of interest. Thank you.

Emman Spain, THPO

Thlopthlocco Tribal Town

PO Box 188

Okemah, OK 74859

Phone: 918-560-6198 ext. 113

From: Sullivan, John [mailto:j35sullivan@blm.gov]
Sent: Thursday, January 05, 2017 3:09 PM
To: thpo@ttown.org
Subject: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

If you have any questions please let me know.

Thanks

jms

–

John M. Sullivan, RPA
BLM Eastern States Office
Southeastern States District
State Archaeologist/Tribal Coordinator
Deputy Preservation Officer
273 Market Street
Flowood MS 39232

601-919-4675 (Office)
601-717-3600 (Cell)
601-919-4700 (Fax)

Sullivan, John <j35sullivan@blm.gov>

RE: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

Bryant Celestine <Celestine.Bryant@actribe.org>
To: "Sullivan, John" <j35sullivan@blm.gov>

Wed, Feb 8, 2017 at 3:21 PM

The Alabama-Coushatta Tribe of Texas has no interests in Catahoula or Bienville Parish.

Thank you,

Bryant J. Celestine

Historic Preservation Officer

Alabama-Coushatta Tribe of Texas

571 State Park Road 56

Livingston, Texas 77351

(936) 563 – 1181 (office)

(936) 933 - 7297 (cell)

Celestine.bryant@actribe.org

From: Sullivan, John [mailto:j35sullivan@blm.gov]
Sent: Thursday, January 05, 2017 3:08 PM
To: Bryant Celestine
Subject: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

If you have any questions please let me know

Thanks

jms

John M. Sullivan, RPA
BLM Eastern States Office
Southeastern States District
State Archaeologist/Tribal Coordinator
Deputy Preservation Officer
273 Market Street
Flowood MS 39232

601-919-4675 (Office)

Sullivan, John <j35sullivan@blm.gov>

RE: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

1 message

Lindsey Bilyeu <lbilyeu@choctawnation.com> Mon, Jan 30, 2017 at 3:07 PM
To: "Sullivan, John" <j35sullivan@blm.gov>

John,

The Choctaw Nation of Oklahoma thanks the BLM for the correspondence regarding the above referenced project. Catahoula Parish lies in our area of historic interest. The Choctaw Nation is unaware of any cultural or sacred sites located in the immediate project area. The Choctaw Nation Historic Preservation Department concurs with the finding of "no historic properties affected". However, we ask that work be stopped and our office contacted immediately in the event that Native American artifacts or human remains are encountered.

If you have any questions, please contact me.

Thank you.

Lindsey D. Bilyeu

Senior Compliance Review Officer

Historic Preservation Department

Choctaw Nation of Oklahoma

P.O. Box 1210

Durant, OK 74702

580 924-8280 ext. 2631

Choctaw Nation
Faithful • Family • Culture

From: Sullivan, John [mailto:j35sullivan@blm.gov]
Sent: Thursday, January 05, 2017 3:08 PM
To: Ian Thompson <ithompson@choctawnation.com>; Lindsey Bilyeu <lbilyeu@choctawnation.com>
Subject: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

If you have any questions please let me know.

Sullivan, John <j35sullivan@blm.gov>

RE: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

Alina Shively <ashively@jenachoctaw.org>
To: "Sullivan, John" <j35sullivan@blm.gov>

Mon, Jan 30, 2017 at 11:15 AM

John:

The Jena Band of Choctaw Indians' THPO has no objection, so long as Section 106 consultation occurs prior to any ground disturbing activities on these projects. Catahoula Parish has many sites that are significant to the IBCI. Thank you for the opportunity to comment.

Sincerely,

Alina J. Shively

Jena Band of Choctaw Indians

Tribal Historic Preservation Officer

P.O. Box 14

Jena, LA 71342

(318) 992-1205

ashively@jenachoctaw.org

United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232
http://www.es.blm.gov

IN REPLY REFER TO: 8100 (020)
JMS EOIs 2245/2255, Catahoula Parish

Jan. 05, 2017

Mr. Phil Boggan, SHPO
Department of Culture, Recreation & Tourism
P.O. Box 44247
Baton Rouge, LA 70804

Dear Mr. Boggan:

The Bureau of Land Management (BLM) has received two Expressions of Interest (EOIs) 2254 and 2255, to lease federal minerals under privately owned surface, i.e. split-estate minerals. The Bureau's Reasonably Foreseeable Development scenario (RFD) for this proposed lease is one well on each tract. EOI 2254 will have a net disturbance of 2.63 acres. EOI 2255 will have a net disturbance of 3.09 acres. The disturbance includes: access road, gathering line and reserve pit to access these federal minerals. There will be no Fracking involved in accessing these federal minerals.

The legal locations of the approximately 32.21 acres of federal mineral tracts are as follows (map enclosed):

Louisiana Meridian
Catahoula Parish (Jonesville South Quadrangle)
EOI 2254 - T. 6 N., R. 7 E., Sec. 6, Lot 2 (8.25 acres)
EOI 2255 - T. 6 N., R. 7 E., Sec. 6, Lot 25 (2.0 acres)

A review of the Louisiana Division of Archaeology site files shows sites or surveys within one mile of the proposed lease sale. Development locations have not been determined on a site-specific basis. Specific locations proposed for development are determined by the developer and surface owners. The BLM's surface responsibilities rest only within the boundaries of any proposed development.

Sullivan, John <j35sullivan@blm.gov>

JMS EOI 2261, Bienville Parish, LA.

1 message

E. Spain <espain@tttown.org> Tue, Jan 31, 2017 at 3:48 PM
To: j35sullivan@blm.gov

Dear Sir,

Thlopthlocco Tribal Town has received Bureau of Land Management notice of an Expression of Interest (EOI) 2261, to lease federal minerals. The proposed lease is four wells on one pad, net disturbance of 8.65 acres. Further, conventional HV Fracking is to be used to access the minerals. At this time we cannot support the use of the Fracking techniques. The impact of Fracking techniques are not fully understood and more study is required. We believe that fracking has a detrimental impact on the subsurface of the ground that could impact the water table. It is our opinion that fracking should be discontinued and we strongly object to its use on federal lands. Thank you.

Emman Spain, THPO

Thlopthlocco Tribal Town

PO Box 188

Okemah, OK 74859

Phone: 918-560-6198 ext. 113

Sullivan, John <j35sullivan@blm.gov>

RE: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

Bryant Celestine <Celestine.Bryant@actribe.org>
To: "Sullivan, John" <j35sullivan@blm.gov>

Wed, Feb 8, 2017 at 3:21 PM

The Alabama-Coushatta Tribe of Texas has no interests in Catahoula or Bienville Parish.

Thank you,

Bryant J. Celestine

Historic Preservation Officer

Alabama-Coushatta Tribe of Texas

571 State Park Road 56

Livingston, Texas 77351

(936) 563 – 1181 (office)

(936) 933 - 7297 (cell)

Celestine.bryant@actribe.org

From: Sullivan, John [mailto:j35sullivan@blm.gov]
Sent: Thursday, January 05, 2017 3:08 PM
To: Bryant Celestine
Subject: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

If you have any questions please let me know

Thanks

jms

John M. Sullivan, RPA
BLM Eastern States Office
Southeastern States District
State Archaeologist/Tribal Coordinator
Deputy Preservation Officer
273 Market Street
Flowood MS 39232

601-919-4675 (Office)

Sullivan, John <j35sullivan@blm.gov>

RE: JMS EOI 2261, Bienville Parish, LA

1 message

Lindsey Bilyeu <lbilyeu@choctawnation.com>
To: "Sullivan, John" <j35sullivan@blm.gov>

Mon, Jan 30, 2017 at 2:57 PM

John,

The Choctaw Nation of Oklahoma thanks the BLM for the correspondence regarding the above referenced project. Bienville Parish lies in our area of historic interest. The Choctaw Nation is unaware of any cultural or sacred sites located in the immediate project area. The Choctaw Nation Historic Preservation Department concurs with the finding of "no historic properties affected". However, we ask that work be stopped and our office contacted immediately in the event that Native American artifacts or human remains are encountered.

If you have any questions, please contact me.

Thank you,

Lindsey D. Bilyeu

Senior Compliance Review Officer

Historic Preservation Department

Choctaw Nation of Oklahoma

P.O. Box 1210

Durant, OK 74702

580-924-8280 ext. 2631

Choctaw Nation

For the Family & Culture

From: Sullivan, John [mailto:j35sullivan@blm.gov]
Sent: Thursday, January 05, 2017 3:08 PM
To: Ian Thompson <ithompson@choctawnation.com>; Lindsey Bilyeu <lbilyeu@choctawnation.com>
Subject: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

If you have any questions please let me know.

Sullivan, John <j35sullivan@blm.gov>

RE: EOIs 2254/2255 Catahoula Parish, EOI 2261 Bienville Parish

Alina Shively <ashively@jenachoctaw.org>
To: "Sullivan, John" <j35sullivan@blm.gov>

Mon, Jan 30, 2017 at 11:15 AM

John:

The Jena Band of Choctaw Indians' THPO has no objection, so long as Section 106 consultation occurs prior to any ground disturbing activities on these projects. Catahoula Parish has many sites that are significant to the JBCI. Thank you for the opportunity to comment.

Sincerely,

Alina J. Shively

Jena Band of Choctaw Indians

Tribal Historic Preservation Officer

P.O. Box 14

Jena, LA 71342

(318) 992-1205

ashively@jenachoctaw.org

United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232
http://www.es.blm.gov

IN REPLY REFER TO: 8100 (020)
JMS EOI 2261, Bienville Parish

Jan. 05, 2017

Mr. Phil Boggan, SHPO
Department of Culture, Recreation & Tourism
P.O. Box 44247
Baton Rouge, LA 70804

Dear Mr. Boggan:

The Bureau of Land Management (BLM) has received an Expression of Interest (EOI) 2261, to lease federal minerals under privately owned surface, i.e. split-estate minerals. The Bureau's Reasonably Foreseeable Development scenario (RFD) for this proposed lease is four wells on one pad. EOI 2261 will have a net disturbance of 8.65 acres. The disturbance includes; access road, gathering line and reserve pit to access these federal minerals. This well will require conventional or HV Fracking to access these federal minerals.

The legal locations of the approximately 39.9 acres of federal mineral tracts are as follows (map enclosed):

Louisiana Meridian
Bienville Parish (Sparta Quadrangle)
T. 16 N., R. 7 W., Sec. 28, SWNE (approx. 39.9 acres)

A review of the Louisiana Division of Archaeology site files shows sites or surveys within one mile of the proposed lease sale. Development locations have not been determined on a site-specific basis. Specific locations proposed for development are determined by the developer and surface owners. The BLM's surface responsibilities rest only within the boundaries of any proposed development.

APPENDIX C: REASONABLY FORSEEABLE DEVELOPMENT

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

Case File Number: EOI 2254

Project Number:

Acres: 8.25

Location: Louisiana Meridian, Catahoula Parish, T6N, R7E, Sec. 6, Lot 2

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective is Paleocene – Eocene Wilcox Formation. Commodity is crude oil and associated natural gas. Oil and Gas Occurrence Potential is High. Oil and Gas Development Potential is moderate.

Federal acreage will be incorporated into a state determined drilling unit. Drilling and Production units vary between 14 and 40 acres.

A 20' wide well access road will be constructed consisting of a 12' wide travel surface with a 4' buffer on each side.

If productive, oil and gas handling and production facilities will be constructed on the existing pad. For field development, production facilities may be centrally located.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

Wilcox wells DO NOT require Fracking. A small volume (420 gallon) acid wash may be used in order to clean perforations.

B. Surface Disturbance Due to Oil and Gas Activity

Access Roads: 1.84 acres (4000' X 20')

Well Pad & Pit: 0.92 acres (200' X 200')

Utility and/or Pipeline R.O.W: 0 - Use access roads ROW.

Initial Disturbance: 2.76 acres

Partial Reclamation of Drill Site: 0.13 acres

Net Disturbance for Productive Well: 2.63 acres

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

Case File Number: EOI 2255

Project Number:

Acres: 2.00

Location: Louisiana Meridian, Catahoula Parish, T6N, R7E, Sec. 6, Lot 5

II. Reasonably Foreseeable Development

C. RFD Baseline Scenario Assumptions and Discussion

Objective is Paleocene – Eocene Wilcox Formation. Commodity is crude oil and associated natural gas. Oil and Gas Occurrence Potential is High. Oil and Gas Development Potential is moderate.

Federal acreage will be incorporated into a state determined drilling unit. Drilling and Production units vary between 14 and 40 acres.

A 20' wide well access road will be constructed consisting of a 12' wide travel surface with a 4' buffer on each side.

If productive, oil and gas handling and production facilities will be constructed on the existing pad. For field development, production facilities may be centrally located.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

Wilcox wells DO NOT require Fracking. A small volume (420 gallon) acid wash may be used in order to clean perforations.

D. Surface Disturbance Due to Oil and Gas Activity

Access Roads: 2.3 acres (5000' X 20')

Well Pad & Pit: 0.92 acres (200' X 200')

Utility and/or Pipeline R.O.W: 0 - Use access roads ROW.

Initial Disturbance: 3.22 acres

Partial Reclamation of Drill Site: 0.13 acres

Net Disturbance for Productive Well: 3.09 acre

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

Case File Number: EOI 2261

Project Number:

Acres: 39.9

Location: Louisiana Meridian, Bienville Parish, T16N, R7W, Sec. 28, SWNE

III. Reasonably Foreseeable Development

E. RFD Baseline Scenario Assumptions and Discussion

Objective is Lower Cretaceous Hosston thru Jurassic Bossier/Haynesville. Commodity is natural gas and associated condensate. The Oil and Gas Occurrence Potential is High; the Oil and Gas Development Potential is moderate.

Federal acreage will be incorporated into a state determined drilling unit. Drilling and production units are 640 acres or more. Alternate increased density wells are allowed. Project 4 wells drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side. If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

Wells will require conventional or HV Fracking depending on completed formation. Water use estimated at 420,000 to 10, 000,000 gallons per well. Sand use estimated at 500,00 to 15,000,000 pounds.

F. Surface Disturbance Due to Oil and Gas Activity

Access Roads: 0.68 acres (1000' X 30')

Well Pad & Pit: 6.94 acres (550' X 550')

Utility and/or Pipeline R.O.W: 1.37 acres

Initial Disturbance: 8.99 acres

Partial Reclamation of Drill Site: 0.34 acres

Net Disturbance for Productive Well: 8.65 acres